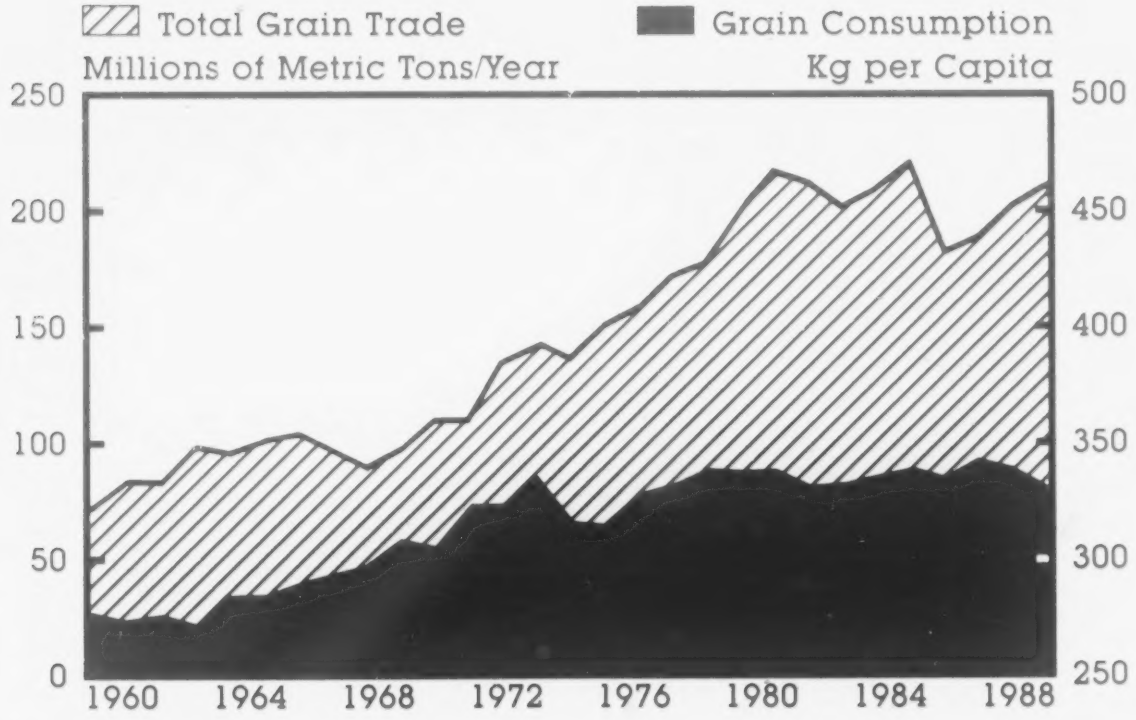
# World Food Trade and U.S. Agriculture, 1960-1988

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# World Food Trade and U.S. Agriculture 1960-1988

Ninth Edition

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# Abstract

U.S. shares of global grain exports increased substantially in 1988-89 for the second consecutive year, along with increased trade shares for some livestock and poultry products. Early indications are that U.S. trade shares may remain steady to slightly higher in the 1989-90 trade year, due to growing demand in centrally planned countries, adverse weather in some non-U.S. areas, and continuation of U.S. agricultural policy changes implemented in mid-1986. GATT negotiations are expected to lead to somewhat reduced global trade restrictions in the 1990s.

Global grain stocks declined sharply to minimum levels considered adequate for global food security during the past two years. Low stocks reflect weather problems in several important grain producing areas, and large-scale, long-term U.S. land-idling programs. Low stocks will increase potential volatility in agricultural prices, livestock production, and global grain trade shares in the next few years if widespread weather problems re-occur.

World agriculture is approaching a technological revolution through biotechnology, with potential increases in livestock feeding efficiency soon to emerge. Longer-term developments may include increased crop yields and new products from agriculture, all of which will affect global agricultural and trade policies.

Increased U.S. agricultural exports have contributed to improved financial health of U.S. agriculture and reduced government program costs. Export trends will be a major influence on both areas in the 1990s. Recent projections show continued U.S. export growth to 1996.

**Key Words:** Grain, oilseeds, corn, soybeans, wheat, agricultural exports, global food trade, GATT, agricultural imports, Soviet grain imports, Chinese grain imports, world livestock production, biotechnology, trade policies.

# Contents


vi Forward

1 Summary and Implications

3 Introduction

4 **1988-89 World Food Situation: Sharp Decline in Production, Increased Trade, Stocks at Minimum Food Security Levels**
4 World Grain Utilization Down, Trade Up Modestly
5 Short- and Intermediate-Term Prospects
6 World Wheat Production and Stocks Decline
7 World Coarse Grain Production Down, Stocks Decline Sharply
8 World Rice Production, Stocks Up
9 World Oilseed Production, Exports, Stocks Decline

13 **Long-Term Trend in World Grain Area and Yields**
13 Wheat Area Declines, Coarse Grain Area Up
13 Rice Area Turns Upward After One-Year Decline
14 Changes in U.S. Farm Programs Help Balance World Supply and Demand
14 Longer-Term Prospects
14 Trends in Global Grain Yields

17 **Trends in Global Oilseed Area and Yields**
18 Future Trends in World Soybean Production

20 **World Livestock and Poultry Meat Production Trends**
20 Pork Production Up, Beef Down
20 Continued Upward Trend in Global Poultry Production

22 **U.S. Shares of Wheat and Coarse Grain Trade Rise Substantially**
22 Long-Term Trend in Wheat Trade Patterns
23 Coarse Grain Export Shares

25 **Soybean and Soybean Product Trade Shares**
25 Soybeans
26 Soybean Meal
27 Soybean Oil

28 **Trade Shares in Livestock Product Exports**
28 Beef and Veal Exports
28 Pork Export Shares
28 Poultry Meat Export Shares

30 **Developments in Soviet Agriculture and U.S. Trade Relationships**
30 1988-89 Soviet Coarse Grain Imports Up Sharply but Well Below Record
30 Longer-Term Grain Production Prospects
31 Oilseed Prospects
31 Livestock Sector
32 U.S.-USSR Grain Agreement

33 **Financial Developments Affecting U.S. and World Agricultural Trade**
33 Key Problem Areas
33 Adjustments of Developing Nations to Debt Burdens
33 Exchange Rate Volatility

35 **China, India Remain Net Grain Importers**
35 China
35 India

37 **U.S. Agricultural Exports Rise in 1988, Imports Steady**

39 **U.S. Government-Assisted Export Programs: Export Enhancement Program (EEP) Remains Large**
39 Concessional Export Assistance Programs
39 Non-Concessional Export Assistance Program
39 Cargo Preference Change and Concessional Export Programs

40 **U.S. Agricultural Trade Trends by Commodity Groups**
40 Composition of U.S. Agricultural Exports
41 U.S. Agricultural Imports
42 U.S. Agricultural Exports by Leading States and by Economic Groupings of Destinations
42 Trends in U.S. Corn and Coarse Grain Exports by Destination
44 Trends in U.S. Soybean and Soybean Product Exports by Destination
48 U.S. Wheat Exports by Destination
49 Trends in U.S. Red Meat and Poultry Exports by Destination

51 **U.S. Price and Income Support Levels Continue to Decline**
51 Corn Loan Rates Down
52 Loan Rates for Other Crops Also Lowered
52 U.S. Target Prices to Decline in 1990
52 Supply Control Provisions
52 Grain Reserve Programs
53 Implications for U.S. and World Agriculture

54 **U.S. Shift to Increased Poultry Meat Consumption Continues, Impacts Feed Demand**

55 **U.S.-European Community Trade Tensions Stabilize**

56 **Oil Importing and Exporting Nations and U.S. Agricultural Exports**
57 Oil-Exporting Nations Are Substantial Market for U.S. Agriculture

59 **Barter Trading and U.S. Exports**

60 **Longer-Term Trade Prospects Improve**

62 **GATT Negotiations Continue Slow Progress**
62 GATT and Its Origins
62 Requirement for Effective GATT Negotiations
63 GATT Positions

65 **The U.S.-Canadian Free Trade Agreement**

66 **Linkages of U.S. Agriculture to Global Trade Policies**

67 **Exchange Rate Impacts on Agriculture**

68 **Trade Subsidies**

69 **Biotechnology: Implications for Future World Agricultural Trade**
69 Livestock Biotechnology
69 Crop Biotechnology
69 Development of New Uses for Farm Products

71 **Other Trade Policy Developments and Issues**
71 Dealing With Developing-Nation Debts
71 Trade Protectionism
71 Food Security
72 Policies Related to Value-Added Exports

73 **Notes**

77 **Bibliography**

81 **Appendix I. Classification of Countries by Economic Category**

82 **Appendix II. Potato, Cassava, and Pulse Production by Major Producing Areas**

84 **Appendix III. Major Destinations of U.S. Soybean Exports in 1975-76 and 1987-88**

85 **Appendix IV. Sources of U.S. Beef and Pork Imports in 1987-88**

86 **Appendix V. Wheat and Coarse Grain Exports by Major Non-U.S. Exporters**

87 **Appendix VI. World Milk Production, 1968-89, by Major Producing Regions**

88 **Appendix VII. Long-Term Trends in Wheat and Coarse Grain Production and Trade for Selected Regions and Nations**

# List of Tables


1. Combined World Production, Utilization, Trade, and Carryover Stocks of All Grains in 1988-89, Projections for 1989-90, and Comparisons with Selected Recent Years in Millions of Metric Tons 4

2. World Wheat Production, Utilization, Trade, and Carryover Stocks in 1988-89, Projections for 1989-90, and Comparisons with Selected Recent Years in Millions of Metric Tons 6

3. World Coarse Grain Production, Utilization, Trade, and Carryover Stocks in 1988-89, Projections for 1989-90, and Comparisons with Selected Recent Years in Millions of Metric Tons 7

4. World Milled Rice Production, Utilization, Trade, and Carryover Stocks in 1988-89, Projections for 1989-90, and Comparisons with Selected Recent Years in Millions of Metric Tons 9

5. World Oilseed Production, Crush, Trade, and Carryover Stocks in 1988-89 and Selected Recent Years in Millions of Metric Tons 10

6. World, U.S., and Foreign Production of Oilseed Products in 1972-73, 1979-80, 1985-86, 1986-87, 1987-88, and 1988-89 in Millions of Metric Tons 11

7. Coarse Grain and Wheat Area Harvested in Millions of Hectares in Selected Major Producing Countries, 1988-89, and Comparisons with Recent Years 14

8. Comparative Yields in Metric Tons per Hectare of Selected Grain Producing Countries 15

9. Soybean Area Harvested in Millions of Hectares in Major Producing Countries in 1988-89 and Comparisons with Selected Recent Years 17

10. Comparative Yields in Metric Tons per Hectare of Selected Soybean Producing Countries 19

11. Pork Production in Major World Producing Areas, 1974-78 Average, 1980, 1981, and 1985 through 1989 in Millions of Metric Tons 20

12. Beef and Veal Production in Major World Producing Areas, 1974-78 Average, 1980, 1981, and 1985 through 1989 in Millions of Metric Tons 20

13. Total Poultry Meat Production in Major World Producing Areas, 1974-78 Average, 1980, 1981, and 1985 through 1989 in Millions of Metric Tons 21

14. World Poultry Meat Exports by Selected Exporters, 1974-78 Average, 1979, 1981, and 1985 through 1989 in Thousands of Metric Tons 29

15. Soviet Grain, Soybean, and Soybean Meal Importing Patterns in Millions of Metric Tons, Selected Years 1975-76 through 1988-89 30

16. Soviet Oilseed Production in Millions of Metric Tons, 1972-73 through 1988-89, and Projections for 1989-90 32

17. Value of U.S. Agricultural Exports by Type of Commodity, 1976-77, 1980-81, 1985-86, and 1987-88 in Billions of Dollars 40

18. Value of U.S. Agricultural Imports in 1975-76, 1984-85, 1985-86, and 1987-88 October-September Fiscal Years by Commodity Groups in Billions of Dollars 41

19. Imports of Selected Agricultural Products by Oil-Exporting Nations, 1972-82 and 1984-87 56

20. U.S. and Major Exporter Net Export Forecasts for Wheat, Coarse Grains, Soybeans, and Soybean Meal in 1990-91 and 1995-96, and Comparisons with 1987-88 in Millions of Metric Tons 61

Appendix II

1. Cassava Production in Major Producing Nations from 1973 through 1987 in Millions of Metric Tons 82

2. World Pulse Production in Major Producing Areas from 1973 through 1987 in Millions of Metric Tons 83

Appendix III

1. Percentage Shares of U.S. Soybean Exports to Major Foreign Destinations in 1975-76 and 1987-88 84

Appendix IV

1. Percentage Shares of Dollar Value of U.S. Beef and Veal Imports from Major Foreign Origins in 1987-88 85

2. Percentage Shares of Dollar Value of U.S. Pork Imports from Major Foreign Origins in 1987-88 85

Appendix VI

1. World Milk Production, 1968-89, by Major Producing Areas in Millions of Metric Tons 87

Appendix VII

1. Long-Term Trend in Grain Production for Selected Regions and Nations in Millions of Metric Tons 88

2. Long-Term Trend in Net Exports of Grains for Selected Regions and Nations in Millions of Metric Tons 88

# List of Figures


1. Annual Change in Total World Grain Trade, 1964-65 through 1988-89, in Millions of Metric Tons 5

2. World Grain Production and Consumption in Millions of Metric Tons, and Carryover Stocks as Percentage of Annual Consumption, July-June 1964-65 through 1988-89 6

3. U.S. Corn, Wheat, and Soybean Price Support Loan Rates, 1947-48 through 1989-90 8

4. World Protein Meal Production by Type of Product, 1975-76 through 1988-89 11

5. World Fat and Oil Production by Type of Product, 1969-70 through 1988-89 12

6. World Harvested Area Devoted to Individual Grains in Millions of Hectares, 1964-65 through 1988-89 13

7. World Grain Yields in Metric Tons per Hectare, 1963-64 through 1988-89 15

8. U.S. Corn Yields in Bushels per Acre, 1953-88 16

9. World Yields in Metric Tons per Hectare, and Harvested Area Devoted to Major Oilseeds, 1980-81 through 1988-89 17

10. World Area Harvested in Millions of Hectares of Selected Oilseeds, 1980-81 through 1988-89 18

11. World Yields in Metric Tons per Hectare of Selected Oilseeds, 1980-81 through 1988-89 18

12. U.S. Soybean Yields in Bushels per Acre, 1953-88 19

13. Percentage Shares of World Wheat Exports by Major Exporters, July-June 1974-75 through 1988-89 22

14. Percentage Shares of World Coarse Grain Exports by Major Exporters, 1974-75 through 1988-89 22

15. World Wheat Exports by Country of Origin, Calendar Years 1966-87 23

16. World Coarse Grain Exports by Country of Origin, Trade Years 1969-70 through 1988-89 24

17. World Corn Exports by Country of Origin, Calendar Years 1966-87 24

18. Percentage Shares of World Soybean Exports by Major Exporters, October-September 1979-80 through 1988-89 25

19. World Soybean Exports by Country of Origin, Calendar Years 1966-87 25

20. Percentage Shares of World Soybean Meal Exports by Major Exporters, October-September 1979-80 through 1988-89 26

21. Percentage Shares of World Soybean Oil Exports by Major Exporters, October-September 1979-80 through 1988-89 26

22. World Soybean Meal Exports by Country of Origin, Calendar Years 1966-87 27

23. World Soybean Oil Exports by Country of Origin, Calendar Years 1966-87 27

24. Percentage Shares of World Beef and Veal Exports by Major Exporters, 1974-89 Calendar Years 28

25. Percentage Shares of World Pork Exports by Major Exporters, 1974-89 Calendar Years 29

26. Trend in USSR Grain Yields in Metric Tons per Hectare, 1967-88 31

27. Trend in Chinese Grain Production, 1973-74 through 1988-89 35

28. Trend in Indian Grain Production, 1973-74 through 1988-89 36

29. Dollar Value of U.S. Agricultural Exports and Imports, 1975-88 Calendar Years 37

30. Net U.S. Trade Balance in Agricultural and Nonagricultural Products by Calendar Years, 1964-88 38

31. Value of U.S. Agricultural Exports by Commodity, 1973-88 Calendar Years 40

32. Value of U.S. Agricultural Imports by Commodity, 1976-88 Calendar Years 42

33. Value of U.S. Livestock Product Exports by Type of Product, 1976-88 Calendar Years 42

34. Value of U.S. Red Meat Imports by Type of Product, 1976-88 Calendar Years 43

35. Value of U.S. Agricultural Exports by Selected States in Billions of Dollars, Fiscal Years 1984-85 through 1987-88 43

36. U.S. Agricultural Export Percentage Shares in Value to Selected Destinations, 1976-77 and 1987-88 Fiscal Years 44

37. U.S. Wheat Export Percentage Shares to Selected Destinations, October-September 1975-76 and 1987-88 44

38. U.S. Corn Export Percentage Shares to Selected Destinations, October-September 1975-76 and 1987-88 45

39. U.S. Corn Exports by Destination, October-September 1966-67 through 1987-88 45

40. U.S. Coarse Grain Exports by Destination, October-September 1966-67 through 1987-88 46

41. U.S. Soybean Exports by Destination, October-September 1966-67 through 1987-88 46

42. U.S. Soybean Meal Exports by Destination, October-September 1966-67 through 1987-88 47

43. U.S. Soybean Oil Exports by Destination, October-September 1966-67 through 1987-88 47

44. U.S. Wheat Exports by Destination, October-September 1966-67 through 1987-88 48

45. U.S. Beef and Veal Exports by Major Destinations, 1980-81 through 1987-88 October-September Fiscal Years 49

46. U.S. Pork Exports by Major Destinations, 1979-80 through 1987-88 October-September Fiscal Years 49

47. U.S. Exports of Edible Offals and Variety Meats by Major Destinations, 1979-80 through 1987-88 October-September Fiscal Years 50

48. U.S. Fresh and Frozen Chicken and Turkey Exports by Major Destinations, 1979-80 through 1987-88 October-September Fiscal Years 50

49. U.S. Per Capita Meat Consumption, 1980-89 54

50. U.S. Corn Exports to Oil Exporting Nations, 1974-75 through 1987-88 57

51. U.S. Wheat Exports to Oil Exporting Nations, 1974-75 through 1987-88 57

Appendix II

1. World Potato Production by Millions of Metric Tons by Major Producing Areas, 1966-87 Calendar Years 82

Appendix V

1. Wheat Exports by Major Non-U.S. Exporters, July-June 1988-89 and Comparisons with Recent Years in Millions of Metric Tons 86

2. Coarse Grain Exports by Major Non-U.S. Exporters, October-September 1988-89 and Comparisons with Recent Years in Millions of Metric Tons 86

# Foreword

With this issue, the Midwest Agribusiness Trade Research and Information Center (MATRIC) assumes responsibility for publishing this report. Changes in funding and administration have prompted the World Food Institute to phase out financial support of this publication, which it initiated and developed over the last eight years. Because of the important public service provided by this report and the widespread interest in its continuation, MATRIC will annually publish *World Food Trade and U.S. Agriculture*.

MATRIC was established in 1987 as a cooperative effort between Iowa State University and the Des Moines Chamber of Commerce Federation. MATRIC's mission is to expand international trade in agribusiness products produced in the Midwest by small and midsize businesses. This is achieved by improving the quality and reducing the cost of information, identifying technologies that improve competitiveness, and providing information on trade policy impacts. MATRIC is funded by a U.S. Department of Agriculture international trade development center grant and matching support from Iowa State University and the Des Moines Chamber of Commerce.

This report supports one of MATRIC's key objectives: the transfer and exchange of information on international markets and trade policies. In future issues of this report, increased attention will be devoted to international markets and trade policies affecting high value and processed agricultural products in the United States.

With the successful completion of negotiations between the United States and Japan on reducing trade barriers for citrus and meat, the ongoing multilateral trade negotiation in the Uruguay round of the GATT, the policy deliberations in the United States on the 1990 food and agricultural legislation, the extensive policy reforms under way in Eastern Europe and the Soviet Union, moves toward economic integration in the Europe 1992 program, and the conclusion of the U.S.-Canada Free Trade agreement in 1989, the trading environment for agricultural products in the world will be open to many potential changes during the next decade. Staying abreast of these changes and their implications for U.S. food and agricultural trade will be an important component of this report.

MATRIC intends to continue the high quality of the reports and the responsiveness to readers that was established by the World Food Institute. We welcome comments and suggestions from readers that would improve the content and the quality of this publication. These comments can be directed to the author or to MATRIC.

William H. Meyers, Executive Director, MATRIC, Iowa State University

Ed Lowe, International Business Development Director, MATRIC, Des Moines Chamber of Commerce

# Summary and Implications

The trade years 1987-88 and 1988-89 provided the first major tests of whether dramatically changed U.S. agricultural policies are accomplishing their intended purposes of increasing U.S. farm income and regaining lost U.S. shares of global exports. A sustained increase in U.S. exports of most major commodities in physical volume and substantially increased export values along with a record U.S. net farm income in 1988 suggest that the policy changes implemented in mid- to late 1986 are working. But part of the increase in U.S. exports and export shares may be temporary since it reflects serious weather problems in 1987 and 1988 in several important crop producing areas including Canada, parts of the Southern Hemisphere, Eastern Europe, and the Indian subcontinent. Other important elements in the 1988-89 world agricultural situation include the largest one-year decline in global grain carryover stocks on record; continued large but decreasing costs of agricultural price and income support programs in the U.S., the European Community (EC), and Japan; increasing global trade in farm products; continued food shortages in parts of Africa; and strong pressure from the U.S. to end or substantially reduce agricultural subsidies by the turn of the century through current General Agreement on Tariffs and Trade (GATT) negotiations.

Declining world grain and oilseed carryover stocks are due to a combination of reduced grain area harvested, and two consecutive substantial declines in world grain production, one of which was the largest in recent times. Global utilization of all grains in 1988-89 is estimated to have declined by 0.5 percent, thus bringing a modest decline in per capita grain utilization for the second consecutive year. Utilization is estimated to have decreased in the U.S., USSR, Canada, Argentina, and some developing nations. Growth in world grain utilization was halted by tightening domestic supplies in countries experiencing serious 1987 and 1988 weather problems, slow economic growth in some areas, already high levels of per capita grain consumption in the U.S. and the EC, and dietary trends in the U.S. World grain production in 1988-89 fell 3.5 percent below a year earlier after declining by 4.4 percent in 1987-88. The 1987-88 decline was the largest one-year decline in at least 25 years and exceeded the 4 percent decline of 1983-84.

A reduction in the total harvested grain area of 3.5 percent from the previous year in 1987-88 accounted for a significant part of the decline in world grain production. One-third of the decline in global area harvested was due to aggressive U.S. government short-term and long-term land-idling programs. The remaining decline reflected reduced area harvested due to drought and depressed world grain prices. The U.S. cropland area idled by government programs in 1988 exceeded the entire cropland area of France and Spain. Reduced plantings in 1987-88 brought world harvested grain area to the lowest level since 1972-73 and 6.7 percent below the peak 1981-82 level. Harvested area in 1988-89 increased by 0.8 percent from the previous year's low level.

An important area of uncertainty for agricultural producers and agribusiness firms is the speed with which idled cropland may return to production in response to the strong increase in world grain prices in 1988-89. With sharply reduced U.S. and world carryover stocks, the U.S. has changed its government wheat production control program to increase 1989-90 plantings. Similar changes could be made in its 1989-90 feed grain program. In addition, improved weather and crop prices may encourage foreign producers in some areas to plant recently idled marginal cropland.

World grain trade continued to expand in 1988-89, for the third consecutive year. Global exports of all grains rose by an estimated 4 percent, down from the 1987-88 growth rate of 7 percent. Increased trade reflected growing demand in Pacific Rim nations, 1988 Soviet coarse grain production problems, reduced production in several other important importing nations, and heavily subsidized exports of wheat and barley by the U.S. and the EC. Despite the recovery in export growth, combined world exports of all grains in the 1988-89 trade year were 5 percent below the 1984-85 record level.

With substantially reduced production, global grain carryover stocks at the end of 1988-89 recorded the largest decline on record. Preliminary data indicate global stocks fell by 100 million metric tons, substantially exceeding the 58 million ton decline in 1987-88 as well as the 53 million ton decline of 1983-84 when global stocks were reduced sharply by aggressive U.S. land-idling programs and a severe U.S. drought. At the global level, grain carryover stocks declined by an estimated 25 percent from the previous year. Other large declines in global carryover stocks in the previous two and one-half decades include decreases of 15 percent in 1983-84 and 1970-71 (the year of the U.S. corn blight and drought), 16 percent in 1972-73, and 19 percent in 1965-66. With sharply declining stocks, the world grain carryover at the beginning of the 1989-90 trade year of approximately 18 percent of annual utilization is about equal to the generally accepted standard for minimum food security needs. Although U.S. agricultural price support and trade policies have changed dramatically since early 1986, the U.S. continues to play a large role in balancing changes in globally available grain supplies with global needs. About 80 percent of the reduction in world grain carryover stocks in 1988-89 was due to a decline in U.S. carryover stocks as old-crop supplies were moved into commercial channels to meet domestic and export needs.

Because of sharply below normal precipitation in the spring and early summer in major grain and oilseed producing regions of the U.S. and Canada, global grain production and supply prospects for 1989-90 are modestly below normal. The U.S. and Canada normally produce about one-fifth of the world's total grain crop. Early indications are that world grain exports may show relatively little growth in 1988-89, due to increased production in several important importing nations. The trend in carryover stocks and prices, however, will depend heavily on the yield of North American grain and oilseed crops in 1990.

U.S. shares of global exports of most of its major agricultural products increased substantially in 1988-89 for the second consecutive year. Increased export shares reflected aggressive U.S. government export assistance programs for wheat, barley, sorghum, and vegetable oils; reduced supplies in some other exporting nations; and large U.S. reserve stocks that were readily available to move into export markets as global import demand increased. Improved foreign crops may reduce the U.S. share of global grain exports slightly in 1989-90.

Longer-term economic indicators, including fiscal and monetary policy of industrial nations and continued public and private debt burdens in developing and developed nations, suggest the world economy will grow at a modest rate during the next few years but with much slower growth than in the 1970s. That, along with limited inflation and moderate energy costs, should encour-

age modest growth in world utilization and exports of farm products. The growth rate also may be tempered by lower real incomes and foreign exchange earnings of oil exporting nations than in the 1970s and early 1980s. In 1988-89, nearly two-fifths of U.S. corn exports (including those sold to the USSR) and 36 percent of U.S. wheat exports went to petroleum exporting countries. Unless major weather problems continue over a wide area, the emergence of new crop production technology and wider application of currently available technology are likely to maintain the long-term upward trend in global crop production through the mid-1990s.

These prospects indicate competition in world grain markets is likely to remain substantial for the next few years. In the current world economic environment, grain exporters face strong pressures to maintain or expand their respective shares of world trade in order to maintain incomes of farmers and reduce the cost of government farm programs. Similar pressures also exist in world markets for livestock, dairy, and poultry products as well as industrial goods. Consequently, one of the strongest predatory and protectionist trade environments since the late 1920s and early 1930s has emerged with some danger that major farm product exporters will continue a prolonged and expanded trade war that could spill over into industrial products. Evidence of this environment includes aggressive export subsidies and export enhancement programs by U.S. and the EC; threats of import restrictions to be imposed by the U.S., the EC, Canada, and other nations; strong negative sentiment toward industrial product imports into the U.S,; and major concern in the U.S. Congress about the large U.S. trade deficit.

This environment creates a need for caution in implementing policy changes related to trade and export subsidies. The lessons of the 1930s are a reminder that protectionist trade practices can lead to shrinking global export markets and declining global economic activity. Similarly, the current export subsidy war carries the danger of downward pressure on world farm product prices with a return of favorable weather conditions and less aggressive U.S. land-idling programs.

The present world agricultural situation and prospects for the next few years suggest that an immediate return to the agricultural environment of the 1970s is unlikely. Instead, several more years may be required to bring equilibrium in the world supply and demand for major agricultural products. But the downward trend in U.S. agricultural export volumes appears to have ended as a result of sharply reduced U.S. price support levels, U.S. export expansion programs, and modest growth in the world economy. Lower U.S. support prices and a moderate exchange rate of the U.S. dollar against foreign currencies should at least slightly improve the competitiveness of American farm product exports in the next few years. This trend also appears likely to be reinforced by a gradually expanding world economy in the early to mid-1990s.

In dealing with U.S. and global agricultural problems and in formulating appropriate policies, important linkages between agriculture and the general economy should be recognized. Trade is a two-way relationship in which one partner's purchases generate revenue to provide purchases and trade flows in the opposite direction. For example, clothing that U.S. consumers buy from East Asia or oil purchased from Mexico provides foreign exchange those nations can use to buy U.S. farm products. The size of the resulting purchases is influenced by the health of the U.S. and world economy, exchange rates, interest costs and their impacts on foreign nations, and a number of other factors. Sustained improvement in the U.S. and world agricultural economic environment will require monetary and fiscal policies aimed at stabilizing currency exchange rates and interest rates at realistic levels, promoting sustained economic growth, and assisting developing nations in dealing with debt problems.

With sharply reduced global grain and oilseed carryover stocks, food shortages in the world's poorest nations and especially in parts of central Africa continue to be a major challenge to world policy makers. Food security in a sizable part of the developing world is an important agricultural policy issue and should not be overlooked when dealing with the problems of agricultural trade of developed nations.

# Introduction

World agricultural trade, including both exports and imports, continues to have a major impact on the financial health of U.S. production agriculture and agribusiness firms in the crop, livestock, poultry, and dairy sectors. World agricultural developments also are important elements in the cost and effectiveness of farm policies in the U.S. and other nations. Through a process of internationalization that began in the early 1970s, U.S. agriculture continues to be strongly and irreversibly linked with global weather patterns, crop production, consumer demand, and government policies.

Key developments in global agriculture as the 1980s close include declining world grain stocks, large-scale, long-term U.S. land-idling programs, a recent slight downward trend in global grain trade, continued tensions between the U.S. and several of its trading partners over trade policies, and an expected conclusion of GATT negotiations in late 1990. In addition, dramatic changes are occurring in political and economic policies of Eastern Europe, USSR, and China. These changes will have important implications for other trading nations. Several countries in this group are beginning to shift from centralized management of their economies to more decision making at lower levels. These changes are bringing greater use of economic incentives and disincentives, and increased priority on consumer demands.

GATT negotiations, if successful, will accelerate recent reductions in impediments to trade in primary and value-added agricultural products. Those reductions are illustrated by implementation of the U.S.-Canadian Free Trade Agreement in 1989, recent Japanese actions to reduce and eventually remove import restrictions on beef and other farm products, and a late 1989 commitment by the Republic of Korea to greatly reduce or remove import barriers on a large number of agricultural products. If GATT negotiations attain the objectives proposed by the U.S., major changes will be required in U.S. agricultural policy, including removal of import restrictions on dairy products, sugar, livestock, livestock products, and vegetable oils. The U.S. GATT proposal also would require removal or major modification of the U.S. deficiency payment and supply control systems for major crops in order to remove income supports that are production related. Net effects on the U.S. agricultural sector likely would be both positive and negative, with large changes from U.S. government policies of recent years and increased risk-exposure in incomes of some agricultural producers.

Adding further uncertainty to the global setting is the fact that world grain stocks were depleted to minimum levels considered desirable for world food security as a result of drought in 1987, 1988, and 1989 in several important grain producing regions. Low stocks will lead to potential volatility in world prices for grains, oilseeds, and livestock products, as well as pressure for policy adjustments to increase stocks. Along with these issues that are of concern to consumers and producers in more affluent nations, much of the developing world continues to struggle with limited resources for importing food; difficulties in generating needed investments in the food sector; and increasing agricultural productivity; debt burdens; and vulnerability to short-term fluctuations in grain supplies.

Looking beyond immediate problem areas, world agriculture is approaching a possible new technological revolution stemming from biotechnology. The first fruits of this revolution are expected to be commercially available in the next three to five years in the dairy and pork industries. These developments may be capable of sharply increasing dairy and pork productivity per animal and substantially increasing feed conversion efficiency in pork production. If widely used, reduced grain feeding per animal in the pork industry may affect grain producers as well as the cost of pork to consumers and the competitiveness of pork with other meats. That, in turn, may require adjustments in the world beef industry.

In short, the pace of change in world agriculture appears to be on the verge of accelerating substantially. Impacts will be felt in production agriculture as well as agricultural input, marketing, transportation, financing, and processing industries. Policy makers in the U.S. and other nations will need to make appropriate adjustments to changing conditions, as will individuals and firms with current or planned investments in agriculture.

This report is intended to provide information on the current and prospective position of U.S. agriculture in a global market. It also traces the path U.S. agriculture followed to reach its current position and the likely direction of change in the years ahead. Also, it provides information on emerging developments that decision makers will need to follow closely as world agriculture enters the 1990s.

# 1988-1989 World Food Situation: Sharp Decline in Production, Increased Trade, Stocks at Minimum Food Security Levels

The world food situation in 1989 reflects two consecutive years of sharply reduced grain production and continued moderation of the financial stresses on global agriculture of the mid-1980s. However, serious financial problems remain among some producers and agribusiness firms worldwide. World grain production declined by an unusually large 3.5 percent in 1988-1989 as a result of weather problems in North America, Argentina, and parts of USSR and China, and large-scale U.S. land-idling programs. This was the fourth largest percentage decline in two and one-half decades, but fell slightly short of the 4.0 to 4.5 percent declines experienced in 1974-75, 1983-84, and 1987-88. Lower production and stocks in some importing countries prompted a world grain trade increase of about 3 percent, the third consecutive annual increase. Aggregate trade in all grains, however, remained 5 percent below the 1984-1985 record. Increased trade, higher prices for major crops, and U.S. government drought assistance were important elements behind the continued improvement in financial condition of agricultural producers, farm supply and marketing firms, and agricultural lending institutions in the U.S. However, significant ongoing structural changes are occurring in these industries and some segments may experience a reversal of financial positions as a result of the severe 1988-89 North American drought and reduced inventories.

In the U.S., the net agricultural trade balance increased for the second year in a row, but remained moderately below the level of the mid- to late 1970s and early 1980s. Recent major U.S. agricultural policy changes were maintained during the 1988-89 trade year for the third consecutive season in an effort to continue the expansion in U.S. farm product exports. These policies, along with weather problems in some foreign areas, have substantially increased the physical volume of the nation's agricultural exports. However, foreign debt burdens, strong international competition, and slow economic growth in some areas have held the value of exports moderately below the levels in the early 1980s. U.S. policies continue to have substantial impacts on agricultural producers and handlers in the U.S. and other grain-producing nations.

Other developments in the world agricultural scene include: (1) reduced but still large costs of government farm programs in the U.S., Western Europe, and other areas; (2) continued friction between the European Community (EC) and the U.S. over export subsidies, import restrictions, and other trade policies; (3) a slight easing of the international debt problem of some oil-exporting nations due to increased petroleum prices (4) reduced purchasing power and a worsening of debt problems in several oil-importing developing nations; (5) a modest rise in input costs in U.S. agricultural production, including those for fertilizer, chemicals, land rental rates, and farm machinery; and (6) slow progress toward a reduction in trade subsidies through GATT negotiations. These developments are likely to have a net positive impact on the competitive position of U.S. farm product exports in the next few years, although a return to the sustained rapid export growth rates of the 1970s is unlikely in the immediate future.

Food shortages remain serious in several African countries and in parts of Latin America and southeast Asia. With recently reduced world supplies resulting from areas of severe drought in 1988 and 1989, there is an increased challenge in meeting the short- and long-term food needs of these nations.

Total U.S. exports of raw agricultural products and value-added items continued their recent upward trend in dollar value, despite drought-reduced supplies. However, the nation's exports of some items, such as soybeans and wheat, declined partly because of limited supplies.

### World Grain Utilization Down, Trade Up Modestly

Table 1 shows the world supply and utilization of all grains in 1988-89 and comparisons with recent years. Preliminary data indicate aggregate world grain trade increased by 3 percent, or seven million metric tons, with global grain trade being the fourth highest level on record. Increased trade reflected expanded imports by the USSR and some Pacific Rim countries. However, growth in trade was only about one-eighth as large as the decade average annual percentage rate of the 1970s. Soviet imports are estimated to be about one-fourth above the previous year's level because of a sharp decline in 1988 coarse production, subsidized U.S. and European grain exports, and slightly increased utilization. Figure 1 compares the change in 1988-89 world grain exports with the pattern of the past two and one-half decades.

**Table 1. Combined World Production, Utilization, Trade, and Carryover Stocks of All Grains in 1988-89, Projections for 1989-90, and Comparisons with Selected Recent Years in Millions of Metric Tons.**

| July-June Trade Years | Production | Utilization | Trade | Ending Stocks* | Stocks as % of Utilization |
|---|---|---|---|---|---|
| Projected | | | | | |
| 1989-90 | 1,670.9 | 1,687.2 | 210.3 | 292.4 | 17.3 |
| Preliminary | | | | | |
| 1988-89 | 1,558.7 | 1,653.9 | 207.1 | 308.6 | 18.7 |
| 1987-88 | 1,606.5 | 1,666.5 | 200.8 | 399.1 | 24.0 |
| 1986-87 | 1,684.8 | 1,656.0 | 187.5 | 459.1 | 27.7 |
| 1985-86 | 1,663.6 | 1,596.2 | 181 | 430.2 | 27.0 |
| 1984-85 | 1,646.5 | 1,586.2 | 219 | 362.8 | 22.8 |
| 1983-84 | 1,485.3 | 1,538 | 208 | 302 | 19.7 |
| 1982-83 | 1,548 | 1,500 | 201 | 355 | 23.6 |
| 1981-82 | 1,497 | 1,476 | 211 | 307 | 20.8 |
| 1980-81 | 1,447 | 1,475 | 216 | 286 | 19.4 |
| 1979-80 | 1,428 | 1,440 | 198 | 315 | 21.8 |
| 1976-77 | 1,363 | 1,303 | 158 | 281 | 21.5 |
| 1971-72 | 1,194 | 1,169 | 110 | 223 | 19.1 |
| 1966-67 | 1,004 | 973 | 104 | 189 | 19.4 |
| 1961-62 | 813 | 835 | 83 | 185 | 22.2 |

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; FG 6-88, June 1988; FG 8-88, August 1988; FG 11-89, November 1989; various other issues. Includes wheat, milled rice, and coarse grains.
*Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

World grain utilization declined slightly for the first time in 14 years during 1988-89. Aggregate world utilization declined by an estimated 1 percent, reducing per capita world grain utilization by about 3 percent. Grain utilization declines in 1988-89 are estimated to have occurred mainly in the exporting nations of the U.S., Canada, Argentina, and Australia where reduced supplies and higher prices brought a reduction in grain feeding to livestock. Grain utilization increased slightly in Western Europe, China, other Pacific Rim countries, and a number of developing nations.

World grain production in 1988-89 dropped to an estimated 1,559 million metric tons, 3 percent below the previous season's production but 14 percent above production 12 years earlier. The decline pushed production below the long-term upward trend of the previous two decades and lagged modestly behind world population growth. However, total production remained well above the recent low point in 1983-84, despite the smallest global area devoted to grain production since that year's U.S. Payment-in-Kind (PIK) program. World grain harvested area was the second smallest since 1974-75. Reduced plantings reflected drought in several areas, aggressive U.S. land-idling programs and marginal shifts from grain to oilseed production in some other nations. Grain production declined in 1988-89 in the U.S., Canada, USSR, China, and Argentina because of adverse weather. Reduced production in these areas was offset partially by larger grain crops in Europe and a few developing nations. World production in 1988-89 was estimated at 6 percent below utilization. Thus, an increase of about 8 percent in global 1989 grain production is needed to maintain per capita world production at the 1988-89 level without reducing world stocks further.

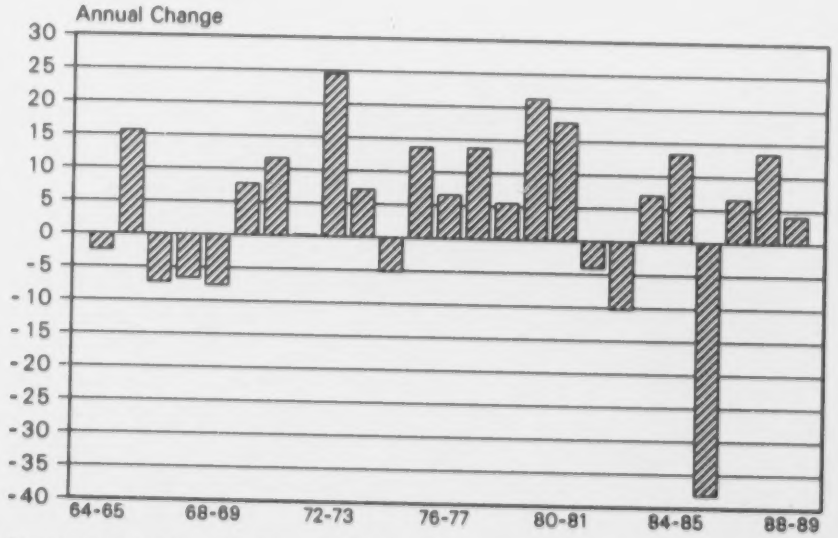
Because production fell short of utilization, global grain carryover stocks declined sharply in 1988-89 for the second consecutive year. Preliminary data place world grain stocks (excluding those in the USSR, China, and certain other centrally planned nations) at 19 percent of total annual utilization, equal to the level considered adequate for world food security.[1] This is the sixth lowest percentage in more than two and one-half decades but is 9 percent above the 1971-72 percentage levels. As usual when world utilization exceeds production, a large part of the decrease in world grain stocks occurred in the U.S., where grain stocks were withdrawn from various government storage programs. Release of government storage stocks tempered the upward movement of U.S. and world grain prices in 1988-89. Because of sharply reduced U.S. government stocks, more significant increases in grain prices are possible in the next two years if growing conditions are well below normal in sizable grain-producing regions of the world.

### Short- and Intermediate-Term Prospects

With average weather conditions, U.S. grain production in the next few years may be well above the low 1988 level as a result of less aggressive U.S. government land-idling policies and improved yields. A return to normal weather also would increase Canadian grain production substantially from the drought-reduced 1988 level. Early reports indicate Soviet grain prospects for 1989 are above last year's. That nation has shown a strong tendency toward an alternating pattern of less favorable crops followed by favorable production. In addition, early indicators point to an increase in Australia's grain harvest in 1989-90 due to increased plantings and better rainfall. Improved crops in these areas and in Argentina may increase global grain production at least moderately in the year ahead. Unless widespread weather problems intervene, improved crop management practices and wider geographic application of available production technology appear likely to maintain the long-term upward trend of global grain yields and production in the 1990s. Changes in the Soviet agricultural economic system, emerging biotechnology developments, and expanded use of currently available technology may also contribute to an upward trend in global grain production. The long-term trend in production, utilization, and stocks is shown in Figure 2.

World grain consumption appears likely to resume its long-term upward trend because of world population growth, a likely increase in global grain production, and modest world economic growth. Longer-term trade patterns may be affected by efforts of several major importing nations to increase grain production, thus reducing their grain import requirements. The trend toward increased self-sufficiency of importing nations may slow in the next few years, but is likely to hold growth rates in world grain trade well below those of the 1970s. Growth trends and stability of world grain trade also will be influenced by the success of recent USSR policy changes designed to stimulate lagging productivity in its grain sector.

**Figure 1. Annual Change in Total World Grain Trade, 1964-65 through 1988-89, in Millions of Metric Tons.**




Source: Compiled from U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; FG 3-89, March 1989; various other issues.

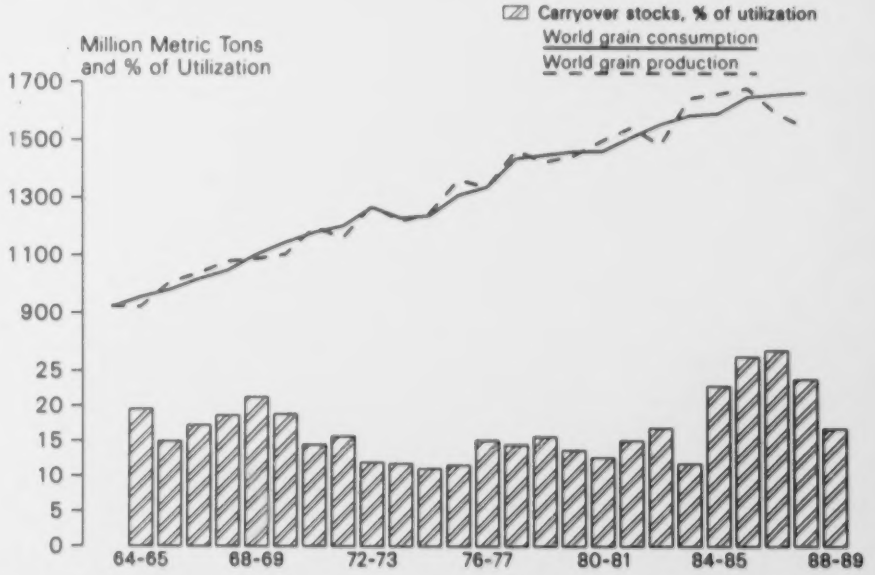
Soviet imports since the early 1970s have been large, highly variable from year to year, and are a major influence on total world grain trade.

## World Wheat Production and Stocks Decline

World wheat production declined slightly in 1988-89 after an unusually large decrease the previous year. World wheat production in 1988-89 fell 6 percent below global utilization, thus bringing a substantial decline in global wheat stocks for the third time in six years in both absolute size and as a percentage of annual world utilization (see Table 2). All of the estimated 0.7 percent decrease in world wheat utilization reflected a decline in the amount of wheat fed to livestock and poultry. Wheat use for livestock and poultry feed is estimated to account for slightly less than one-fifth of total world utilization.

With decreased wheat feeding, use of wheat in 1988-89 dropped below the long-term upward trend for the fifth time in the last 26 years. Preliminary data indicate wheat utilization increased in the 1988-89 trade year in China, India, the EC, and Eastern Europe, but declined in the U.S.,

**Figure 2. World Grain Production and Consumption in Millions of Metric Tons, and Carryover Stocks as Percentage of Annual Consumption, July-June 1964-65 through 1988-89.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; FG3-89, March 1989; various other issues.

**Table 2. World Wheat Production, Utilization, Trade, and Carryover Stocks in 1988-89, Projections for 1989-90, and Comparisons with Selected Recent Years in Millions of Metric Tons.**

| July-June Trade Years | Production | Utilization | U.S. Exports | Non-U.S. Exports | Total Trade[a] | Ending Stocks[b] | Stocks as % of Utilization |
|---|---|---|---|---|---|---|---|
| Projected | | | | | | | |
| 1989-90 | 530.2 | 538.0 | 35.0 | 63.5 | 98.5 | 108.0 | 20.1 |
| Preliminary | | | | | | | |
| 1988-89 | 500.8 | 530.5 | 37.8 | 60.0 | 97.8 | 116.8 | 22.0 |
| 1987-88 | 503.6 | 534.1 | 43.4 | 62.0 | 105.4 | 145.6 | 27.3 |
| 1986-87 | 530.4 | 522.2 | 28.4 | 62.3 | 91.3 | 176.8 | 33.9 |
| 1985-86 | 499.8 | 495.9 | 25.0 | 60.0 | 84.8 | 168.0 | 33.9 |
| 1984-85 | 511.5 | 493.0 | 38.1 | 68.9 | 107.0 | 164.1 | 33.3 |
| 1983-84 | 489.4 | 474.2 | 38.9 | 63.1 | 102.0 | 145.2 | 30.6 |
| 1982-83 | 477.3 | 460.1 | 41.1 | 57.6 | 98.7 | 130.0 | 28.3 |
| 1981-82 | 449.3 | 449.5 | 48.2 | 53.1 | 101.3 | 112.7 | 25.1 |
| 1980-81 | 443.0 | 450.8 | 41.2 | 52.9 | 94.1 | 112.9 | 25.0 |
| 1979-80 | 424.6 | 438.4 | 37.4 | 48.6 | 86.0 | 120.7 | 27.5 |
| 1976-77 | 421.4 | 380.9 | 25.9 | 37.4 | 63.3 | 127.5 | 33.5 |
| 1971-72 | 351.0 | 342.3 | 16.3 | 35.7 | 52.0 | 90.2 | 26.3 |
| 1966-67 | 306.7 | 279.8 | 20.3 | 35.7 | 56.0 | 86.3 | 30.9 |
| 1961-62 | 224.8 | 237.9 | 19.6 | 27.2 | 46.8 | 71.7 | 30.2 |

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Grains*, FG 10-74, April 1974; *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; FG 6-88, June 1988; FG 8-88, August 1988; FG 11-89, November 1989; various other issues. Includes wheat and wheat products.

[a]Totals may not add due to rounding.

[b]Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

USSR, and Canada. Global wheat utilization in 1988-89, estimated to be the second highest on record, was up 26 percent from a decade earlier.

Beginning world wheat carryover stocks in 1989-90, in absolute terms, are about 15 percent above the average of the 1970-82 period, despite a sharp decline in the past two years. But when related to annual utilization, the stocks are no longer a major stabilizing influence on wheat prices as they were in the past five years. They represent approximately 22 percent of annual utilization, the second lowest in at least 30 years and well below the 30 to 34 percent level of the 1983-86 period. Slightly over half the decline in global wheat stocks during the past two years is estimated to have occurred in the U.S., with U.S. carryover stocks down 33 million metric tons and global stocks estimated to be down 60 million metric tons. Wheat carryover stocks also are estimated to have decreased during the last two years in China, EC, Canada, Argentina, Australia, India, Pakistan, and Bangledesh.

The sharply reduced U.S. wheat stocks reflect an increased U.S. share of the world wheat trade in the past two years and severe 1988 crop problems. Wheat exports by the U.S. increased about 9.4 million metric tons, or 33 percent, from 1986-87 to 1988-89 while total non-U.S. exports decreased more than two million metric tons, or 4 percent (see Appendix V, Figure 1). Thus, the U.S. share of global wheat trade increased from 30 percent two years earlier to an estimated 39 percent in 1988-89. The sharply increased U.S. trade share in the past two years reflected major changes in U.S. agricultural policies, including sharply lower price support levels, increased direct government payments to farmers, and greatly expanded export enhancement or export subsidy programs. These policy changes, as the U.S. took steps to regain lost shares of global wheat trade, also contributed to the heightening tension between the U.S. and the EC over trade policies and EC export subsidies. Results of the past two years indicate changes in U.S. farm programs are having an impact on its competitive position in world wheat trade.

### World Coarse Grain Production Down, Stocks Decline Sharply

Global coarse grain (feed grain) production decreased by an unusually large amount in 1988-89 for the second consecutive year. Total output dropped 8 percent below the previous year but remained 4 percent above the level of 11 years earlier (see Table 3).

Much of the decrease in production reflected severely reduced yields in the U.S. and Canada, with U.S. coarse grain output down 66.3 million metric tons and world production down 63 million tons from 1987-88. Other countries and regions reporting reduced course grain production last season included USSR, China, Argentina, and Eastern Europe. The EC's coarse grain production in 1988-89 was moderately above the previous season. Coarse grain output fell short of world utilization by approximately 9 percent and produced the largest one-year decline in global carryover stocks on record. The previous record decline in global coarse grain carryover stocks was in 1983-84, when U.S. production fell sharply as a result of drought and an extremely aggressive government land-idling program. Global stocks that year declined by about 71 million metric tons, compared with a 66 million ton decline in 1988-89.

As in previous years of shortfalls in world production, much of the decline in stocks occurred in the U.S.[2] U.S. coarse grain carryover stocks, according to preliminary data, decreased by 53 percent by fall 1989, dropping approximately 71 million metric tons below levels a year earlier and 89 million tons less than stocks two years

**Table 3. World Coarse Grain Production, Utilization, Trade, and Carryover Stocks in 1988-89, Projections for 1989-90, and Comparisons with Selected Recent Years in Millions of Metric Tons.**

| July-June Trade Years | Production | Utilization | U.S. Exports[a] | Non-U.S. Exports | Total Trade[b] | Ending Stocks[c] | Stocks as % of Utilization |
|---|---|---|---|---|---|---|---|
| Projected | | | | | | | |
| 1989-90 | 805.2 | 814.8 | 58.8 | 37.9 | 96.7 | 135.5 | 16.6 |
| Preliminary | | | | | | | |
| 1988-89 | 729.1 | 797.0 | 61.2 | 33.2 | 94.4 | 145.5 | 18.3 |
| 1987-88 | 791.9 | 813.5 | 53.5 | 29.8 | 83.3 | 211.3 | 26.0 |
| 1986-87 | 835.6 | 810.8 | 47.5 | 36.6 | 84.1 | 232.9 | 28.7 |
| 1985-86 | 843.8 | 779.3 | 36.4 | 46.8 | 83.2 | 208.1 | 26.7 |
| 1984-85 | 815.8 | 782.6 | 55.4 | 44.9 | 100.3 | 143.9 | 18.4 |
| 1983-84 | 687.2 | 758.3 | 56.6 | 36.7 | 93.3 | 110.4 | 14.6 |
| 1982-83 | 784.0 | 753.4 | 53.0 | 37.0 | 90.0 | 181.4 | 24.1 |
| 1981-82 | 766.4 | 741.3 | 60.0 | 37.8 | 97.8 | 150.8 | 20.3 |
| 1980-81 | 731.9 | 747.6 | 70.7 | 37.6 | 108.3 | 125.8 | 16.8 |
| 1979-80 | 744.4 | 741.9 | 71.0 | 28.5 | 99.5 | 141.5 | 19.1 |
| 1976-77 | 704.4 | 684.3 | 50.1 | 33.8 | 83.9 | 115.5 | 16.9 |
| 1971-72 | 626.3 | 609.7 | 24.2 | 25.1 | 49.3 | 104.4 | 17.1 |
| 1966-67 | 517.8 | 514.8 | 20.0 | 20.0 | 40.0 | 84.1 | 16.3 |
| 1961-62 | 440.5 | 447.5 | 15.9 | 14.1 | 30.0 | 105.2 | 23.5 |

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Grains*, FG 10-74, April 1974; *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; FG 6-88, June 1988; FG 8-88, August 1988; FG 11-89, November 1989; various other issues.

[a]Based on market years.

[b]From 1976-77 on, the trade year is October-September.

[c]Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

earlier. Non-U.S. stocks decreased by only about one million metric tons. With the U.S. coarse grain sector still performing most of the burden of adjusting available supplies to meet market demand, the U.S. administration has used newly acquired policy tools to force part of its excess government stocks into world markets. These U.S. tools will be discussed in a section later in this report that reviews recent changes in U.S. agricultural policies.

World coarse grain consumption decreased by slightly over 2 percent in 1988-89, lagging behind the annual world population growth rate. Increased coarse grain utilization was reported in the USSR, China, EC, and several developing nations. Increased utilization in these areas was more than offset by decreased utilization in Eastern Europe, the U.S., and Canada. Changes in world coarse grain utilization reflected a slight expansion in global livestock and poultry output, reduced wheat feeding because of higher-than-normal wheat prices relative to coarse grain prices, and reduced grain feeding rates per animal because of higher coarse grain prices than in the previous season. U.S. prices for maize (corn) were sharply higher than in the previous trade year, and were the eighth highest average prices in the last 15 years. In the trade picture, U.S. trade levels increased for the third consecutive year, after a six-year downtrend in the early and mid-1980s. The U.S. trade share in coarse grains increased in 1988-89 to about 65 percent of world exports, with U.S. exports expected to increase by approximately 8 million metric tons at the same time that aggregate non-U.S. exports increase by an estimated three million tons (see Appendix V, Figure 2).

An important contributing factor in the increased U.S. coarse grain exports in the last three years was the sharp decline in U.S. coarse grain price support levels implemented in the fall of 1986 and continuing through at least 1990 as a result of the U.S. Food Security Act of 1985. The effective U.S. price support loan rate for 1988-crop corn (the most important U.S. coarse grain) was lowered $.78 per bushel (31 percent or $30.73 per metric ton) from the support rate for the 1985 crop. Support levels for other U.S. coarse grains were reduced similarly and other policy tools pushed U.S. prices sharply below the new lower government support levels (see Figure 3) until widespread drought struck the U.S. grain belt in 1988. Since U.S. prices are a major influence on world price levels, the U.S. support level reduction has signaled competing exporters to slow the expansion of their production and may lead to modest additional gains in the U.S. share of global coarse grain trade in future years. Lower world prices than in the 1970s and early 1980s should also encourage slightly accelerated long-term growth of global coarse grain utilization by making livestock and poultry products slightly more affordable to world consumers.

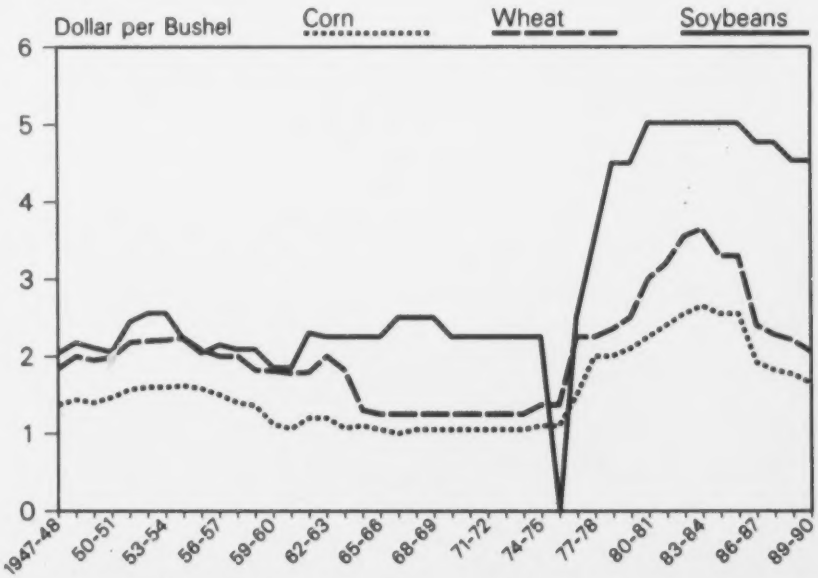
**World Rice Production, Stocks Up**

Global production of rice increased by 4.5 percent in 1988-89 after a slight decline in the previous two years. World rice production has been in a strong long-term upward trend, with only seven years of declining production in the past two and one-half decades. Production in 1988-89 was 1.8 percent above the 1984 and 1985 record and 5.4 percent above production five years earlier. The 1988-89 crop slightly exceeded aggregate world consumption (see Table 4). As a result, world rice stocks are expected to increase slightly both in absolute size and as a percent of annual utilization by the end of the 1988-89 trade year. Increased production reflected sharply increased crops in India and Thailand after a severe drought the previous year. Production was slightly reduced in 1987 in China, Japan, and Pakistan.

World rice consumption increased slightly in 1988-89 after a decline the previous year. Rice consumption has been in a long-term upward trend that included increases every year except three in the previous two and one-half decades. Much of the decrease in utilization in 1987-88 occurred in India, the world's second largest rice-consuming nation, where severe 1987 drought temporarily curtailed utilization.

Reported global rice stocks are projected at 46 million metric tons, 10 percent above last

**Figure 3. U.S. Corn, Wheat, and Soybean Price Support Loan Rates, 1947-48 through 1989-90.**




Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Statistics through 1961*, Statistical Bulletin No. 159 (Washington, D.C.), revised June 1962. Economic Research Service, *Feed Outlook and Situation Report*, FDS 228, April 1969; FDS 231, November 1969; FDS 241, November 1971; FDS 246, November 1972; FDS 260, February 1976; FDS 264, February 1977; FDS 268, February 1978; FDS 272, February 1979; FDS 282, August 1981; FDS 286, August 1982; FDS 292, March 1984; FDS 295, November 1984; FDS 299, March 1986. Economic Research Service, *Wheat Outlook and Situation Yearbook*, WS 277, February 1987; WS 284, February 1989. Agricultural Marketing Service, *Background for 1985 Farm Legislation*, Agricultural Information Bulletin No. 472, 1985; No. 497, 1986.

year. Stocks at this level are equivalent to 14.2 percent of annual utilization, about the same as in the early 1970s. But note that reported stocks exclude those of North Korea, Laos, Vietnam, and China, where official stocks data are not published. These four nations produce approximately 60 percent of the world's rice. Exclusion of their stocks almost certainly substantially understates world stock. Ending U.S. rice stocks in 1988-89 declined by an estimated 44 percent, in contrast to the slight increase at the global level. The U.S. accounts for less than 2 percent of world rice production, but is one of the world's largest rice exporters.

World rice exports are projected to increase by about 20 percent in the 1988-89 trade year. In contrast to other grains, the U.S. share of global rice exports declined slightly in the past two years after increasing sharply in 1986-87. U.S. rice exports for 1988-89 increased an estimated 3 percent from the 1986-87 level while non-U.S. exports increased by an estimated 14 percent.

The U.S., in 1989, was the world's second-ranking exporter of rice, behind Thailand. Other leading rice exporters include the EC, China, and Burma.[3] Rice exports from Thailand and Pakistan in 1989 are expected to be slightly above the previous year's levels. U.S. rice exports are expected to be down 8 percent from the peak level of eight years earlier. Total non-U.S. exports are expected to be up 15 percent from 1980-81.

Among importers, increased imports in 1989 are expected for Indonesia, Iran, Saudi Arabia, and several other smaller importers.

For the longer term, world rice production and consumption appear likely to continue their nearly steady upward trend. Increased consumption will be generated by relatively rapid population growth rates in many major rice-consuming nations. Technological developments and increased application of available technology are likely to maintain the upward trend of global production for the next several years in the absence of widespread adverse weather in key rice-growing areas. Prospects for growth in world trade in rice are less certain and may be restrained by increased production in importing nations.

### World Oilseed Production, Exports, Stocks Decline

Preliminary estimates indicate aggregate world production of eight major oilseeds declined by about 2 percent in 1988-89, primarily because of severe drought in oilseed-producing regions of the U.S. and Canada. Despite the decline, global production remained 5 percent above levels four years earlier. Production of cottonseed, peanuts (groundnuts), copra, and palm kernel increased significantly from the previous year as a result of favorable weather and increased area planted in several major producing regions. The decrease in soybean production was concentrated largely in the U.S. and Argentina, where severe drought lowered production by one-fifth from a year earlier. Production in 1988-89 increased sharply in Brazil in response to favorable weather and increased area planted. An increase in EC production was due largely to increased plantings in southern Europe. The world cottonseed crop increased by approximately 5 percent in 1988-89, after two consecutive years of declining production in 1985 and 1986 and a modest upturn in 1987. The larger cottonseed crop was due mainly to increased area harvested in the U.S. and India, increased yields in USSR, India, and Pakistan. Those increases more than offset slightly reduced production in China. The world's leading cotton and cottonseed producers, in order of size, are China, the U.S., the USSR, India, Pakistan, and Brazil.

Global sunflowerseed production increased by an estimated 1 percent from the previous year as a result of increased production in

**Table 4. World Milled Rice Production, Utilization, Trade, and Carryover Stocks in 1988-89, Projections for 1989-90, and Comparisons with Selected Recent Years in Millions of Metric Tons.**

| July-June Trade Years | Production | Utilization | U.S. Exports[a] | Non-U.S. Exports[a] | Total Trade[a] | Ending Stocks[b] | Stocks as % of Utilization |
|---|---|---|---|---|---|---|---|
| Projected | | | | | | | |
| 1989-90 | 328.7 | 331.7 | 2.5 | 11.1 | 13.6 | 46.0 | 13.9 |
| Preliminary | | | | | | | |
| 1988-89 | 325.2 | 326.4 | 2.8 | 11.7 | 14.5 | 46.3 | 14.2 |
| 1987-88 | 311.1 | 318.9 | 2.2 | 9.8 | 12.1 | 42.2 | 13.2 |
| 1986-87 | 318.8 | 323.0 | 2.4 | 10.2 | 12.7 | 50.0 | 15.5 |
| 1985-86 | 321.0 | 320.7 | 2.4 | 10.1 | 12.5 | 54.2 | 16.9 |
| 1984-85 | 318.9 | 310.8 | 1.9 | 9.4 | 11.3 | 54.9 | 17.7 |
| 1983-84 | 308.6 | 305.1 | 2.3 | 10.3 | 12.6 | 46.6 | 15.3 |
| 1982-83 | 286.5 | 286.5 | 2.2 | 9.7 | 11.9 | 43.3 | 15.1 |
| 1981-82 | 281.6 | 285.4 | 2.7 | 9.1 | 11.8 | 43.3 | 15.2 |
| 1980-81 | 271.6 | 276.8 | 3.0 | 10.1 | 13.1 | 47.2 | 17.0 |
| 1979-80 | 258.7 | 260.2 | 2.7 | 10.0 | 12.7 | 52.4 | 20.2 |
| 1976-77 | 237.0 | 238.1 | 2.1 | 8.5 | 10.6 | 37.8 | 15.9 |
| 1971-72 | 216.4 | 216.8 | 1.8 | 6.9 | 8.7 | 28.4 | 13.1 |
| 1966-67 | 179.3 | 178.7 | 1.7 | 6.1 | 7.8 | 18.6 | 10.4 |
| 1961-62 | 147.3 | 149.2 | 0.9 | 5.4 | 6.3 | 8.5 | 5.7 |

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; FG 6-88, June 1988; FG 8-88, August 1988; FG 11-89, November 1989; various other issues.

[a]Exports are computed on an August-July year basis.

[b]Excludes total stocks in most communist nations due to lack of published data. Stocks are an aggregate of individual marketing years and do not reflect stocks at a single point in time.

Argentina, China, the USSR, and EC, which more than offset the sharp decline in U.S. production. Rapeseed production expanded moderately in Canada and India, offsetting declines in the EC and China. The EC rapeseed crop decreased by 13 percent as a result of declining 1988 yields after increasing sharply in recent years. Copra production increased slightly in response to more favorable weather than the previous year in the Philippines, which is a major producer of this product. Palm kernel production increased by an estimated 8 percent as a result of favorable weather in Malaysia.

According to preliminary projections by the U.S. Department of Agriculture, global exports of major oilseeds departed from the long-term upward trend in 88-89.[4] Preliminary data in Table 5 indicate aggregate 1988-89 exports will be about 3 percent below levels four years earlier and 19 percent below exports the previous season.

World utilization of major oilseeds slowed from its long-term upward trend in 1988-89, with preliminary estimates showing about the same utilization as the previous marketing year. Global oilseed utilization increased each of the past four years at a rate moderately exceeding world population growth, but the growth rate was slowed in 1988-89 by tightening supplies and sharply higher prices than in recent years. The earlier expanded utilization in excess of the population growth rate reflected growing consumer incomes in rapidly and moderately developing nations and a resulting growth in demand for livestock and poultry products. Preliminary estimates indicate global oilseed utilization in the marketing year just ending was 10 percent above the level four years earlier. Growth at that rate reflects an increase in world per capita utilization of approximately 1 percent since 1984-85. Of the major oilseeds, soybeans and rapeseed have shown the strongest increases in utilization in the last four years. Utilization of other oilseeds has been more variable from year to year, due partly to fluctuations in supplies resulting from weather variability in major producing areas. In the years ahead, world oilseed utilization is likely to continue its long-term upward trend in response to growing consumer incomes and efforts by centrally planned nations such as the USSR and China to increase the efficiency of their livestock sectors.

Global carryover stocks of major oilseeds at the end of the 1988-89 trade year are about 8 percent smaller than carryover a year earlier, according to preliminary data. Stocks at that level represent about 13 percent of total annual utilization, the lowest since the mid-1970s. Most of the decrease in oilseed stocks was in soybeans, with reductions concentrated primarily in the U.S. Small increases in carryover stocks of cottonseed and rapeseed occurred. Unlike grains, U.S. soybean exports in 1988-89 were well below the previous year's level, while aggregate non-U.S. exports increased substantially. Increased non-U.S. exports were due largely to a sharp increase in Brazil's March-May 1989 soybean harvest.

Global production of major protein meals in 1988-89 decreased about 1 percent from production a year earlier. In contrast to meal output, global production of major vegetable oils increased by an estimated 2 percent from the previous year's production (see Table 6). Increases in oil production reflect expanded output of palm, sunflowerseed, cottonseed, peanut, coconut, fish, and palm kernel oil. Most of these products are from oilseeds high in oil content. In contrast, soybeans have a relatively low oil content and higher meal yield per ton.[5] Increased oil production, slow growth in world demand, and competition from large butter stocks have held U.S. and world soybean oil stocks at relatively high levels and have kept soybean oil and other vegetable oil prices (in current U.S. dollars) at low levels relative to those for protein meal. Global stocks of most other vegetable oils, and total fats and oil stocks also are at moderate to high levels, but in some cases were below levels a year earlier at the end of the 1988-89 trade year.

Ending world protein meal stocks in 1988-89 were modestly below a year earlier. Declining stocks caused processors to crush oilseeds more for meal than for oil, with meal providing a larger share of the value of oilseeds than in recent years. With a relatively tighter supply situation in meal than in oil, 1988-89 meal prices have been well above the previous year but generally below peak levels of the mid to late 1970s. Early indications point to some tightening of world vegetable oil supplies in the year ahead, but with a possible modest increase

**Table 5. World Oilseed Production, Crush, Trade, and Carryover Stocks in 1988-89 and Selected Recent Years in Millions of Metric Tons.**

| July-June Trade Years | Production | Crush | U.S. Exports | Non-U.S. Exports | Total Trade | Ending Stocks | Stocks as % of Crush |
|---|---|---|---|---|---|---|---|
| Preliminary | | | | | | | |
| 1988-89 | 201.89 | 165.49 | 14.89 | 16.94 | 31.83 | 21.97 | 13.28 |
| 1987-88 | 206.64 | 165.76 | 22.42 | 17.09 | 39.52 | 23.97 | 14.46 |
| 1986-87 | 194.20 | 161.43 | 21.27 | 16.42 | 37.68 | 23.32 | 14.45 |
| 1985-86 | 195.88 | 154.99 | 21.01 | 13.53 | 34.54 | 26.60 | 17.16 |
| 1984-85 | 191.01 | 150.60 | 17.72 | 15.28 | 33.00 | 21.14 | 14.03 |
| 1983-84 | 165.00 | 135.76 | 21.64 | 11.34 | 32.98 | 15.72 | 11.58 |
| 1982-83 | 178.19 | 143.51 | 26.32 | 8.85 | 35.17 | 20.49 | 14.28 |
| 1981-82 | 169.35 | 138.33 | 27.14 | 14.27 | 35.84 | 18.89 | 13.66 |
| 1980-81 | 155.52 | 132.61 | 21.57 | 10.56 | 32.13 | 20.48 | 15.44 |
| 1979-80 | 170.15 | 133.77 | 26.21 | 9.80 | 36.01 | 19.33 | 14.45 |

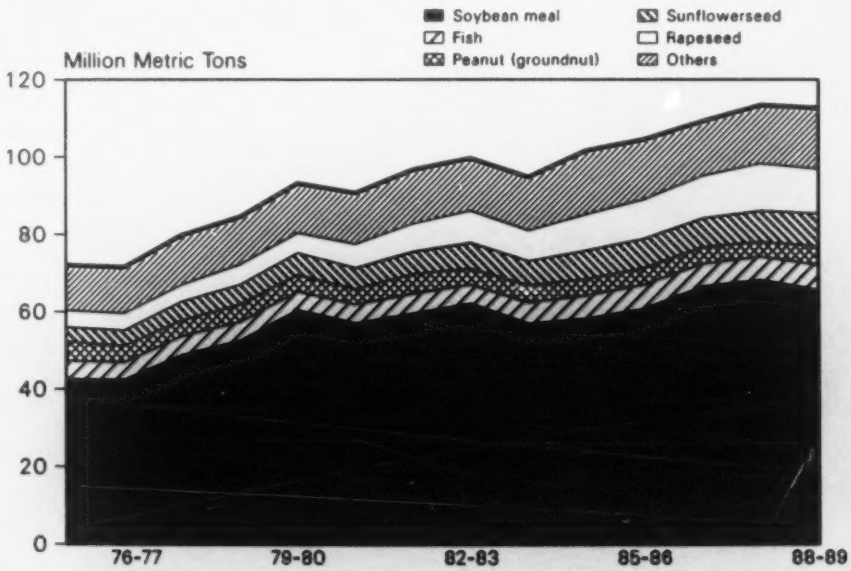
Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Oilseed Situation and Market Highlights*, FOP 6-88, June 1988; FOP 10-89, October 1989; *Foreign Agricuture Circular: Oilseeds and Products*, FOP 4-85, April 1985; and FOP 5-84, May 1984.

in supplies of protein meal through at least April 1990. Meal supplies after April 1990 will depend heavily on new-crop soybean production in Brazil and Argentina. Favorable weather in these two countries and a possible expansion in planted soybean area could lead to an increase in meal supplies from late April 1990 onward.

As Figure 4 indicates, much of the long-term growth in world protein meal production has come from soybean meal. That pattern appears likely to continue over the next several years, with an upward trend in soybean production in South America over the longer term, and an increase in the U.S. in 1989-90. However, with large world wheat supplies and potentially higher yields through expanded use of hybrid varieties, wheat feeding may increase in the next few years. That, along with slower growth in the world economy and continued global debt problems, may hold the growth in the world demand for soybean meal in the early 1990s to a more modest rate than in the 1970s. Wheat has a higher protein content than coarse grains and its use in livestock rations reduces protein meal requirements.

Figure 5 indicates that soybean oil has faced much greater competition from other products in world markets than has soybean meal. Soybean oil production continues to be larger than that of any other individual vegetable, marine, or animal fat or oil. But combined production of all other fats and oils is nearly four times as large as soybean oil production. In the years immediately ahead, soybean meal will likely remain the dominant source of protein meal for livestock and poultry feeding. But, recently expanded palm tree plantings in Malaysia and interest in similar plantings in other tropical nations suggest that a significant part of the growth in world demand for vegetable oils will be supplied by palm oil during the 1990s.[6]

**Figure 4. World Protein Meal Production by Type of Product, 1975-76 through 1988-89.**



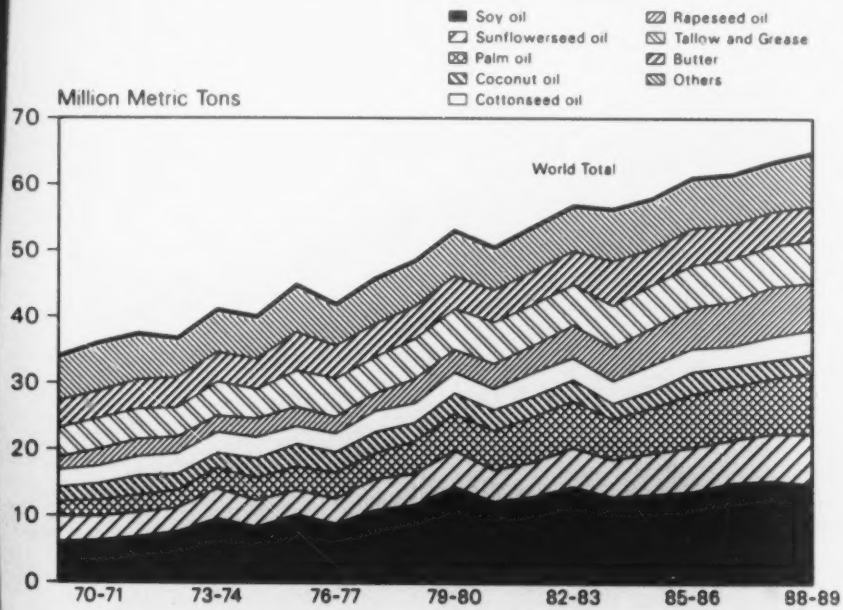

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; FOP 3-89, March 1989; various other issues; and personal communications with officials of U.S. Department of Agriculture.

**Table 6. World, U.S., and Foreign Production of Oilseed Products in 1972-73, 1979-80, 1985-86, 1986-87, 1987-88, and 1988-89 in Millions of Metric Tons.**

| | 44% Protein Meal Equivalent | | | | | | % Change | Fat and Oil Production[a] | | | | | | % Change |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1972-73 | 1979-80 | 1985-86 | 1986-87 | 1987-88 | 1988-89 | 1972-88 | 1972-73 | 1979-80 | 1985-86 | 1986-87 | 1987-88 | 1988-89 | 1972-88 |
| U.S. | 17.8 | 27.3 | 25.0 | 26.0 | 26.6 | 24.9 | 40.1 | 7.8 | 10.4 | 10.0 | 10.2 | 10.8 | 10.1 | 29.5 |
| Non-U.S. | 35.6 | 58.8 | 75.2 | 78.8 | 81.9 | 83.0 | 133.3 | 30.6 | 41.6 | 50.8 | 51.1 | 53.0 | 54.8 | 79.2 |
| World Total | 53.4 | 86.1 | 100.6 | 106.0 | 108.9 | 108.0 | 102.2 | 38.4 | 52.0 | 60.9 | 61.3 | 63.8 | 65.0 | 69.1 |

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Oilseeds and Products*, FOP 4-88, April 1988; FOP 6-89, June 1989; FOP 25-77, December 1977; and personal communication with officials of the U.S. Department of Agriculture.
[a]Excluding linseed oil.

**Figure 5. World Fat and Oil Production by Type of Product, 1969-70 through 1988-89.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; FOP 3-89, March 1989; various other issues.

# Long-Term Trend in World Grain Area and Yields

World harvested grain area in the 1980s deviated from the trend of earlier years, with the area devoted to grain declining after several decades of expansion to a peak in 1981-82. Along with a slight downward trend since the peak year, global grain area has exhibited sizable year-to-year fluctuations, the largest of which occurred in 1987-88. Total world grain area harvested in 1987-88 was 6.4 percent, or 47.2 million hectares, below the 1981-82 record, with reductions in the area devoted to each of the three major categories of grain: wheat, rice, and coarse grains. Global harvested area increased 0.8 percent in 1988-89 but still remained 6 percent below the previous record. Forty percent of the decline in global harvested grain area since 1981-82 can be accounted for by U.S. land-idling programs. U.S. harvested area of grain declined by 5.6 million hectares in 1986-87, 8.1 million hectares in 1987-88, and 3.2 million hectares in 1988-89 as government program incentives for idling cropland increased sharply. Foreign farmers harvested 15 million fewer hectares of grain in 1987-88 than a year earlier, with world harvested area devoted to grain dropping 23.1 million hectares below 1986-87. However, non-U.S. grain harvested area rose by 8.4 million hectares in 1988-89 as foreign producers responded to prospects for higher prices and improved weather. Preliminary data indicate U.S. harvested grain area will expand modestly in 1989-90 and 1990-91 in response to improved weather and reduced government land-idling incentives.

Global grain area harvested likely will be restrained some in the next few years by aggressive U.S. use of long-term land-idling programs, although longer-term factors likely will remain at work to slightly expand grain area in several other countries. Also, short-term U.S. acreage-idling programs in the next few years may take less land out of production than in 1986-89.[7] Factors behind the decades-long expansion of world harvested grain area in the 1970s and early 1980s included more intensive cropping practices, shifts from pasture to grain production, drainage of wet areas, increased double-cropping where climatic conditions permit the practice, land clearing in parts of the U.S. and South America, and increased use of irrigation to convert arid or semi-arid areas to crop production. Year-to-year changes in the world's cropland base resulting from such adjustments have been small. But over a three-decade time span, the impact was sizable and contributed to the long-term upward trend in global food production. The long-term trend was interrupted in the 1982-88 period, as a result of U.S. farm programs, depressed world prices, and weather problems in some areas. However, these developments may play a role in the 1990s in expanding global grain harvested areas.

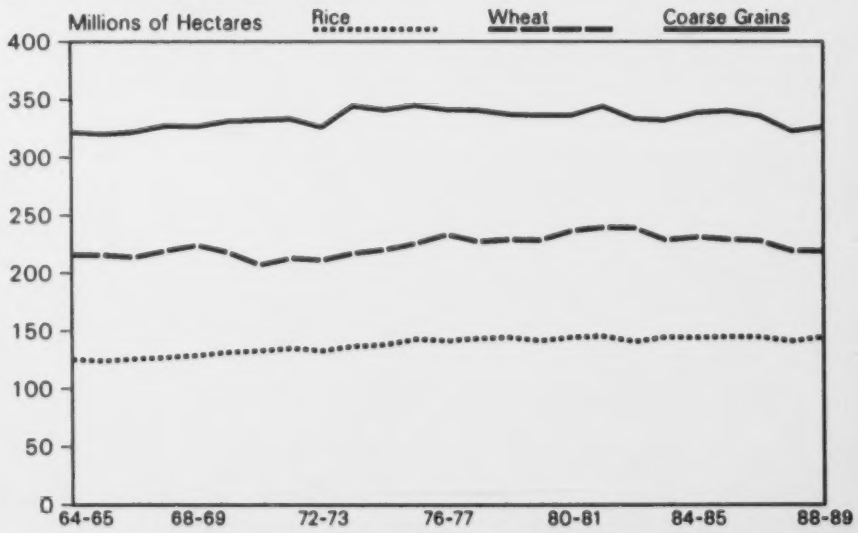
### Wheat Area Declines, Coarse Grain Area Up

Figure 6 and Table 7 indicate world coarse grain area harvested increased slightly in 1988-89 after a two-year downtrend. Reductions in coarse grain areas in the U.S., Argentina, Canada, USSR, and Thailand were offset by increases in several other nations. Global area harvested was up 1 percent from a year earlier but 6.8 percent below the global record reached in 1981-82, and was 1.7 percent larger than levels two decades earlier. World wheat area harvested in 1988-89 was down slightly from area harvested a year earlier and was 8 percent below the 1981-82 record (see Figure 6). From a longer-term perspective, global wheat area was down 4.5 percent from one decade earlier and down 2.3 percent from the harvested area of two decades ago. Wheat harvested area in the U.S. declined by 5 percent in 1988-89 in response to government program incentives. There were also decreases in Canada, Argentina, and slight expansions in the USSR, and several developing nations. U.S. wheat area harvested in 1988-89 was still nearly one-fourth larger than 18 years earlier, when a large amount of U.S. cropland was idled under government programs and the export boom of the 1970s had not yet emerged. Last season's harvested area of all non-U.S. wheat producers was 14.8 percent below the 1970-71 level, with most of the decrease due to an estimated 18 million hectare decline in Soviet wheat area. Non-U.S. wheat producing nations that sharply expanded harvested area in the 1970s and early 1980s included Canada, Argentine, and Australia.

### Rice Area Turns Upward After One-Year Decline

As with other grains, world rice area harvested trended upward in the 1970s and early 1980s. However, peak area harvested was reached in 1986-87, five years later than for other grains. World rice area harvested increased by an estimated 2 percent in 1988-89 after the one year decline (see Figure 6). Preliminary estimates place global area at 0.7 percent less than the record in 1986-87, but 12 percent larger than the area harvested two decades earlier. U.S. rice area harvested in 1988-89 was sharply below its 1981-82 record level

**Figure 6. World Harvested Area Devoted to Individual Grains in Millions of Hectares, 1964-65 through 1988-89.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; FG 3-89, March 1989; various other issues.

as a result of changes in farm programs. However, the reduction in U.S. rice area accounts for only 0.4 million hectares of the change in global rice area since 1981-82. U.S. rice harvested area is expected to remain nearly constant in 1989-90.

### Changes in U.S. Farm Programs Help Balance World Supply and Demand

In 1988-89, as in the recent past, the U.S. continued aggressive land-idling programs as part of an effort to help balance world production and utilization. The U.S. also continued to use lower support prices and large export subsidies to help accomplish that objective. These policy changes and resulting price impacts signaled to foreign producers that expansion of grain plantings should be slowed or halted. Sharply lower U.S. government price support levels and the heavy use of export subsidies to regain lost export market shares, while helping to reduce production and balance supplies with demand, are a sharp contrast to earlier U.S. policies. The year 1983-84 is an excellent example of weaknesses from earlier U.S. unilateral attempts to balance world production and utilization solely by removing U.S. land from production. That year also provides contrasts between the global impact of current and earlier U.S. farm programs. The U.S. Payment-in-Kind program in 1983-84 reduced U.S. wheat area harvested by 23 percent as farmers received government grain in return for reducing their plantings and were allowed to graze or harvest previously planted wheat as hay. At the same time, three regions, Canada, Australia, and Western Europe, expanded their wheat area to take advantage of an expected strong increase in world prices stemming from U.S. actions. Their production response partially offset supply-control efforts of the U.S. After holding their plantings at or near the 1983-84 level for the next three years despite further reductions in U.S. wheat area, some of these countries finally reduced their wheat area in 1987-88 and 1988-89.

Reduced plantings in these exporting nations were partly in response to depressed world wheat prices resulting from lower U.S. price support levels and large U.S. wheat export subsidies that helped to keep world prices below U.S. levels. Net effects from these changes in U.S. agricultural policies included low world wheat prices, high farm program costs to U.S. taxpayers, and a reduction in 1987-88 U.S. and foreign wheat area. Last season's world harvested wheat areas were the lowest in 15 years, while U.S. wheat area was the lowest in 16 years. These policy changes have pushed U.S. and world wheat carryover stocks sharply below the level of the mid-1980s.

### Longer-Term Prospects

World grain area harvested may trend slowly upward into the mid- to late 1990s with a continuation of long-term trends toward more intensive land utilization. However, for the next two to four years, the increase in global grain plantings may be restrained by aggressive government land-idling programs in the U.S. and somewhat depressed world grain prices which limit the incentives for expanded non-U.S. plantings. For the longer term, the greatest potential for expanded plantings appears to be in South America. Land-clearing operations in Brazil are likely to continue in future years and additional Argentine pastureland could be converted to grain production if economic incentives are adequate. With favorable economic conditions, some additional land also could be cleared and drained for crop production in the U.S. However, such land is unlikely to be brought into crop production in significant quantities unless profit margins in crop production increase sharply from current levels and until land in the 10-year U.S. Conservation Reserve land-idling program is released for production in the mid- to late 1990s. The Soviet Union also has additional land that could be brought into crop production through irrigation or drainage. Whether or not such land is utilized will depend on the priority placed on agriculture by the Soviet administration and the cost and availability of imported grain. Saudi Arabia has increased its cultivated grain area sharply in the last few years through irrigation and high grain support prices. Some additional expansion in its grain area also is possible in the 1990s.

### Trends in Global Grain Yields

Over the past 25 years, as shown in Figure 7, world grain yields per hectare have shown an irregular long-term upward trend. During this period, global rice yields increased approximately 88 percent, along with a 64-percent increase for wheat and a 71-percent increase for coarse grains. The global average coarse grain yield has declined moderately since 1984-85 due to

**Table 7. Coarse Grain and Wheat Area Harvested in Millions of Hectares in Selected Major Producing Countries, 1988-89, and Comparisons with Recent Years.[a]**

| Area or Country | Coarse Grains | | | | | | | Wheat | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1970-71 | 1981-82 | 1983-84 | 1985-86 | 1986-87 | 1987-88 | Prelim. 1988-89 | 1970-71 | 1981-82 | 1983-84 | 1985-86 | 1986-87 | 1987-88 | Prelim. 1988-89 |
| W. Europe | 24.0 | 24.4 | 23.3 | 23.8 | 23.1 | 22.1 | 22.5 | 17.0 | 16.4 | 17.0 | 16.2 | 16.6 | 16.8 | 16.3 |
| Canada | 8.4 | 9.2 | 7.8 | 8.3 | 7.8 | 8.0 | 7.2 | 5.1 | 12.4 | 13.7 | 13.7 | 14.2 | 13.5 | 12.9 |
| Australia | 4.3 | 4.8 | 5.8 | 5.2 | 4.4 | 4.6 | 4.5 | 6.5[a] | 11.9[a] | 12.9 | 11.7 | 11.3 | 9.1 | 9.3 |
| Argentina | 7.5 | 6.4 | 6.2 | 5.6 | 4.7 | 4.4 | 3.4 | 3.7 | 5.9 | 6.9 | 5.3 | 5.1 | 4.8 | 4.5 |
| S. Africa | 5.5 | 5.3 | 4.8 | 4.9 | 4.9 | 4.5 | 4.6 | 1.9[a] | 1.8 | 1.8 | 2.0 | 1.9 | 1.7 | 2.0 |
| USSR | 43.9 | 58.0 | 61.2 | 58.5 | 58.6 | 59.5 | 57.0 | 65.2 | 59.2 | 50.8 | 50.3 | 48.7 | 46.7 | 49.0 |
| Total above | 93.6 | 108.1 | 109.1 | 106.3 | 103.5 | 103.1 | 89.2 | 99.4 | 107.6 | 103.1 | 99.2 | 97.8 | 92.1 | 94.0 |
| U.S. | 39.7 | 43.6 | 32.9 | 45.5 | 41.5 | 35.4 | 32.8 | 17.7 | 32.8 | 24.8 | 26.2 | 24.6 | 22.6 | 21.5 |
| Total above | 133.3 | 151.7 | 142.0 | 151.8 | 145.0 | 138.5 | 132.0 | 117.1 | 140.4 | 127.9 | 125.4 | 122.4 | 114.7 | 115.5 |

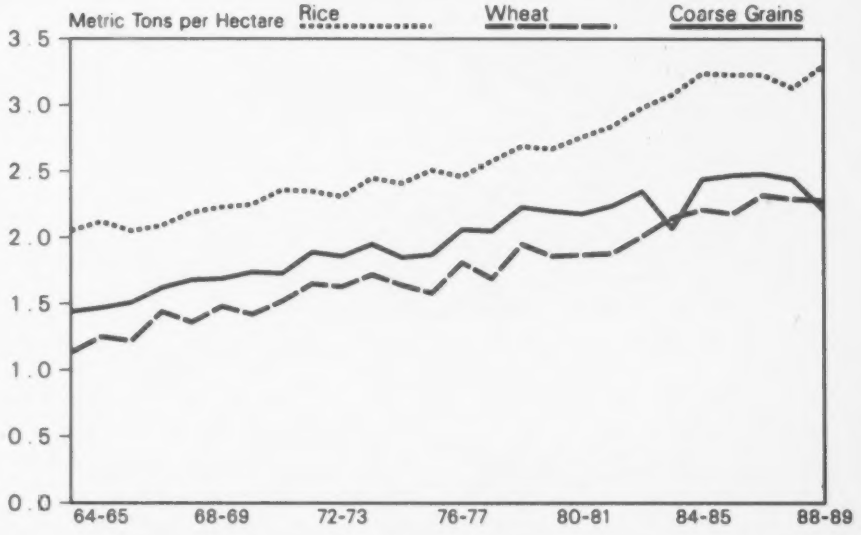
Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Grains*, FG 10-74, April 1974; *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; and *Foreign Agriculture Circular: World Crop Production*, WCP 4-85, April 1985; WCP 4-86, April 1986; WCP 12-87, December 1987; *Foreign Agriculture Circular: World Agricultural Production*, WAP 4-89, April 1989; and personal communications with officials of U.S. Department of Agriculture, Foreign Agricultural Service.
[a]Planted area.

weather problems in parts of the Southern Hemisphere, Eastern Europe, North America, and Southern Asia.

Wheat and rice yields increased at a slightly accelerated rate in recent years until 1987-88 because of the spread of higher-yielding hybrid varieties, increased use of fertilizer, expanded use of irrigation in some areas, and other technological innovations. Rice yields in 1987 and 1988 were restrained by widespread drought in India, Thailand, and neighboring countries. With favorable weather, a resumption of the upward trend in global average grain yields appears likely during the next several years. The upward trend likely will be due to increased applications of yield-improving technology and by an ongoing development of improved varieties, better management, improved cultural practices, and other technological developments.

Figure 8 shows the long-term upward trend in U.S. corn (maize) yields from the early 1950s through 1988. During this period, yields increased at an average rate of slightly over two bushels per acre (0.13 metric tons per hectare) per year, and the upward trend continued into the late 1980s until severe drought struck the U.S. cornbelt in 1988.[8] Figure 8 also shows an increased year-to-year variability of U.S. corn yields in the 1970s and 1980s when compared with the previous two decades. Greater variability of yields in recent years is believed to be due to increased year-to-year fluctuations in temperatures and rainfall in the U.S. cornbelt, rather than to characteristics of corn production technology.

**Figure 7. World Grain Yields in Metric Tons per Hectare, 1963-64 through 1988-89.**



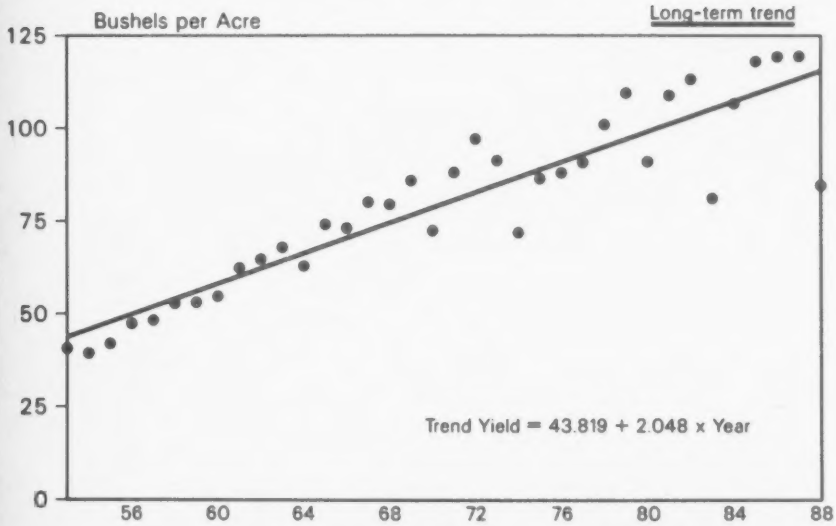

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; FG 3-89, March 1989; various other issues.

**Table 8. Comparative Yields in Metric Tons per Hectare of Selected Grain Producing Countries.**

| | Coarse Grains | | | | | | Wheat | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Area | 1979-80 | 1981-82 | 1983-84 | 1986-87 | 1987-88 | Prelim. 1988-89 | 1979-80 | 1981-82 | 1983-84 | 1986-87 | 1987-88 | Prelim. 1988-89 |
| U.S. | 5.70 | 5.71 | 4.20 | 6.10 | 6.10 | 4.51 | 2.30 | 2.32 | 2.65 | 2.32 | 2.53 | 2.29 |
| Canada | 2.63 | 2.83 | 2.68 | 3.26 | 3.21 | 2.73 | 1.64 | 2.00 | 1.94 | 2.20 | 1.93 | 1.21 |
| Argentina | 2.20 | 2.88 | 2.82 | 2.88 | 2.98 | 2.52 | 1.69 | 1.41 | 1.85 | 1.79 | 1.84 | 1.69 |
| Brazil | 1.73 | 1.71 | 1.65 | 1.95 | 1.87 | 1.76 | 0.75 | 1.15 | 1.11 | 1.44 | 1.76 | 1.59 |
| Australia | 1.47 | 1.37 | 1.63 | 1.51 | 1.47 | 1.46 | 1.45 | 1.38 | 1.70 | 1.45 | 1.27 | 1.52 |
| World | 2.17 | 2.20 | 2.05 | 2.48 | 2.44 | 2.20 | 1.85 | 1.87 | 2.14 | 2.33 | 2.30 | 2.29 |

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Crop Production*, WCP 4-82, April 12, 1982; WCP 3-84, March 9, 1984; WCP 4-85, April 11, 1985; WCP 4-86, April 1986; WCP 7-87, July 1987; *Foreign Agriculture Circular: World Agricultural Production*, WAP 1-88, January 1988; WAP 2-89, February 1989; *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; and personal communications with officials of the U.S. Department of Agriculture, Foreign Agricultural Service.

**Figure 8. U.S. Corn Yields in Bushels per Acre, 1953-88.**




Source: U.S. Department of Agriculture, *Agricultural Statistics 1938*; Foreign Agriculture Service, *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-89, March 1989; Statistical Reporting Service, Crop Reporting Board, *Crop Production 1987 Summary*, CRPR 2-1 (88), January 1988; *Field Crops*, Statistical Bulletin No. 708, and various other issues.

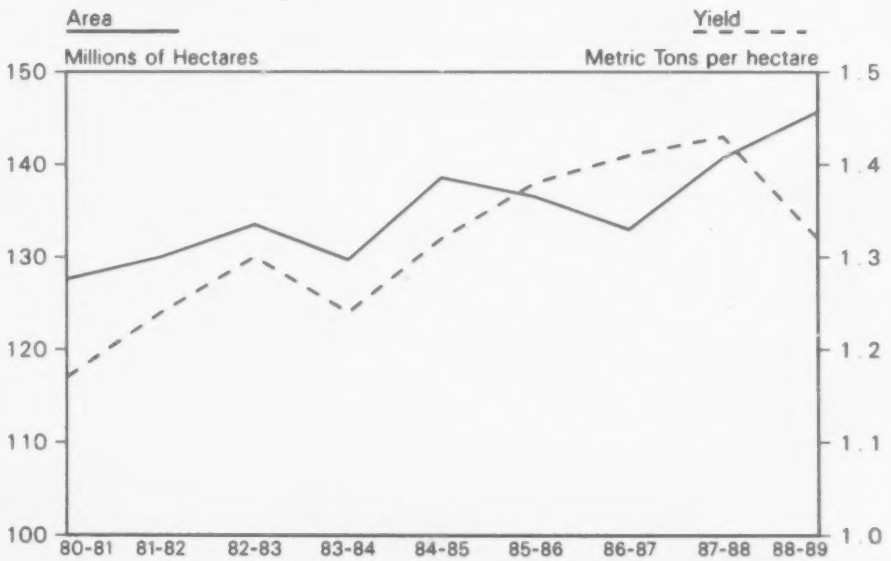
# Trends in Global Oilseed and Soybean Area and Yields

Global oilseed area harvested resumed its long-term upward trend in 1988-89, after a temporary decline two years earlier. With strong oilseed prices, another increase in area harvested is anticipated in 1989-90. The earlier decline reflected reduced soybean area planted in the U.S., reduced cottonseed plantings in the U.S., India, and China, and reduced sunflowerseed plantings in the U.S., Argentina, and the USSR. The 6.0 million hectare decline in U.S. soybean plantings from 1982 to 1987 reflected more attractive returns from production of alternative crops and idling of cropland in various government programs. With better weather and increased soybean plantings, South American soybean area increased substantially in 1988-89 (see Table 9). Total world soybean area harvested in 1988-89 rose 3 percent from the previous year and was about one-fourth larger than a decade earlier. Aggregate world area harvested and the average yield per hectare of all oilseeds are shown in Figure 9, with area devoted to individual crops shown in Figure 10 and yields of individual crops in Figure 11. Harvested area and yields have exhibited a long-term upward trend with downward deviations every one to two years.

The long-term upward trend in global oilseed area reflects land clearing in Brazil, conversion of pastureland to soybeans in Argentina, shifts from small grains and pasture to soybeans in the U.S., and increased rapeseed plantings in Canada, the EC, China, and India. Except for the U.S., these trends appear likely to continue in most areas in the next few years as a result of relatively high oilseed/grain price ratios and policy actions by the EC and India to encourage increased self-sufficiency in oilseed production. Growth of U.S. soybean plantings will be restrained somewhat by the long-term government land conservation reserve program designed to idle highly erodible farmland for up to 10 years.

Average world oilseed yields have been in a gradual long-term upward trend for several years, as shown in Figures 9 and 11 and Table 10. That trend is likely to continue in the years ahead but will be interrupted periodically by unfavorable weather in major growing regions. The upward trend reflects higher-yielding varieties, improved production management, the gradual dispersion of available technology for weed and disease control, and improved harvesting practices to reduce field losses and quality deterioration.

**Figure 9. World Yields in Metric Tons per Hectare, and Harvested Area Devoted to Major Oilseeds, 1980-81 through 1988-89.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; FOP 3-89, March 1989; various other issues.

**Table 9. Soybean Area Harvested in Millions of Hectares in Major Producing Countries in 1988-89 and Comparisons with Selected Recent Years.**

| Area | 1970-71 | 1975-76 | 1983-84 | 1984-85 | 1985-86 | 1986-87 | 1987-88 | Prelim. 1988-89 | Percent Change from 1970-71 to 1988-89 |
|---|---|---|---|---|---|---|---|---|---|
| U.S. | 16.7 | 20.8 | 25.3 | 26.8 | 24.9 | 23.6 | 23.06 | 23.22 | + 39.04 |
| Brazil | 1.3 | 5.8 | 9.3 | 10.1 | 9.5 | 9.3 | 10.52 | 11.80 | + 807.09 |
| Argentina | 0.03 | 0.4 | 2.9 | 3.3 | 3.4 | 3.5 | 4.26 | 4.70 | + 15,566.07 |
| China | 8.0 | 8.8 | 7.6 | 7.3 | 7.7 | 8.3 | 8.45 | 8.14 | + 1.75 |
| Canada | 0.1 | 0.2 | 0.4 | 0.4 | 0.4 | 0.4 | 0.50 | 0.54 | + 440.00 |
| Paraguay | 0.4 | 0.2 | 0.4 | 0.6 | 0.6 | 0.5 | 0.62 | 0.69 | + 72.50 |
| Total | 26.53 | 36.2 | 45.9 | 48.5 | 46.5 | 45.6 | 53.87 | 55.89 | + 110.67 |

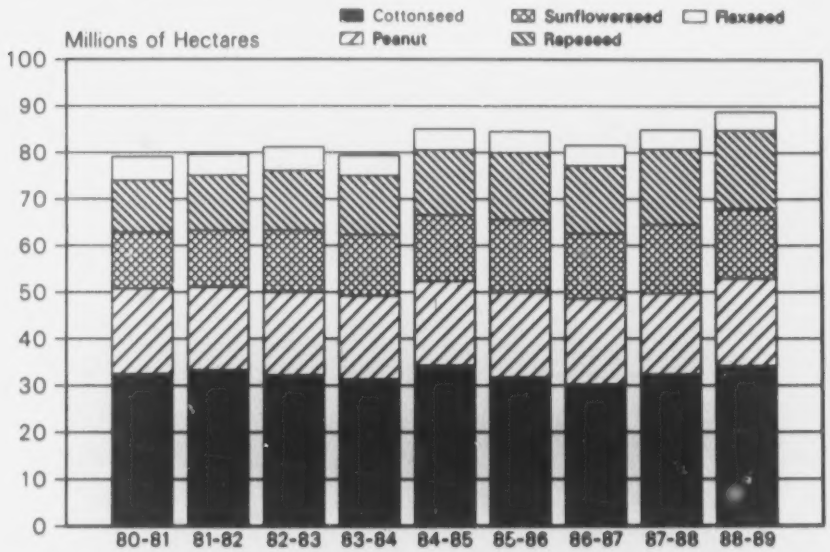
Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Crop Production*, WCP 6-82, May 10, 1982; WCP 4-85, April 11, 1985; WCP 5-86, May 12, 1986; WCP 7-87, July 1987; WCP 12-87, December 1987; *Foreign Agriculture Circular: World Agricultural Production*, WAP 2-89, February 1989; *Foreign Agriculture Circular: Oilseeds and Products*, FOP 3-89, March 1989; FOP 4-83, April 1983; FOP 4-84, April 1984; *Foreign Agriculture Circular: World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; and personal communications with officials of the U.S. Department of Agriculture, Foreign Agricultural Service.

## Future Trends in World Soybean Production

The extent of growth in world demand for protein meal will exert considerable influence on trends in world soybean plantings in the next few years. With indications of a strong long-term upward trend in production of high oil content oilseeds such as palm products,[9] soybeans' comparative advantage will be in the protein sector. Unlike most other oilseeds, soybeans have a relatively low oil content and high protein meal yield per ton. Long-term growth in protein meal demand will depend on several key variables, including global economic growth rates, the exchange rates of the U.S. dollar, adjustments of developing nations to debt problems, and the trend in protein content of livestock and poultry rations in the Soviet Union. Present indications are that world economic growth will trend modestly upward, the U.S. dollar will remain well below previous highs for the next few years, and increased priority will be placed on the use of protein meal in Soviet meat and poultry production. These trends should bring a gradual increase in soybean prices relative to those of grains, and should generate a slight upward trend in soybean plantings in the U.S. in the 1990s and a moderate upward trend in South America.

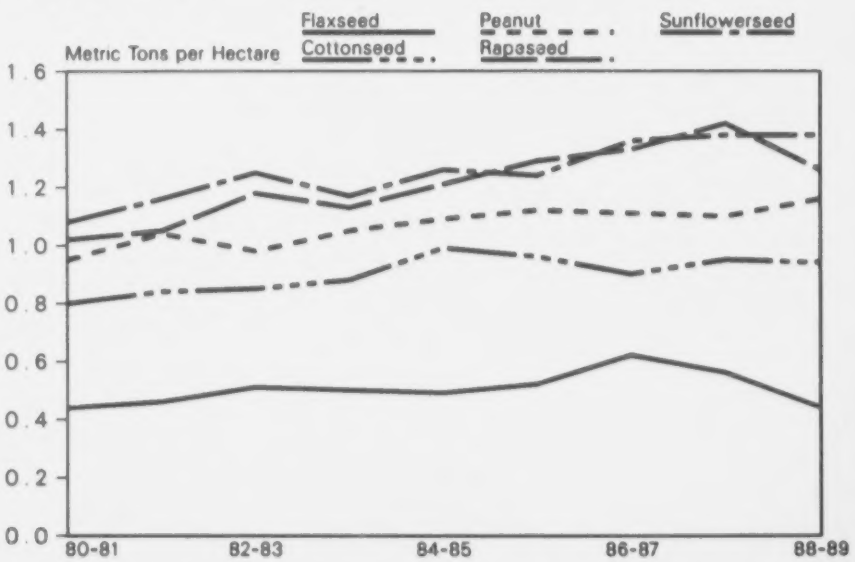
Figure 12 shows the long-term upward trend in U.S. soybean yields. Since the early 1950s, yields in the U.S. have shown an average yearly increase of 0.31 bushels per acre (0.021 metric tons per hectare). Except for occasional interruptions due to adverse weather, this trend is likely to continue during the next several years as available technology and management practices are applied to a larger portion of the planted area. Row spacings, variety selection, pest, disease, and weed control, timing of field operations, fertilization programs, tillage practices, and harvesting procedures to minimize field losses are included in this category. Similar trends appear likely in yields and application of technology and management practices in South America, China, Canada, and other soybean producing nations, given favorable weather during the planting and growing seasons.

**Figure 10. World Area Harvested in Millions of Hectares of Selected Oilseeds, 1980-81 through 1988-89.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; FOP 3-89, March 1989; various other issues.

**Figure 11. World Yields in Metric Tons per Hectare of Selected Oilseeds, 1980-81 through 1988-89.**



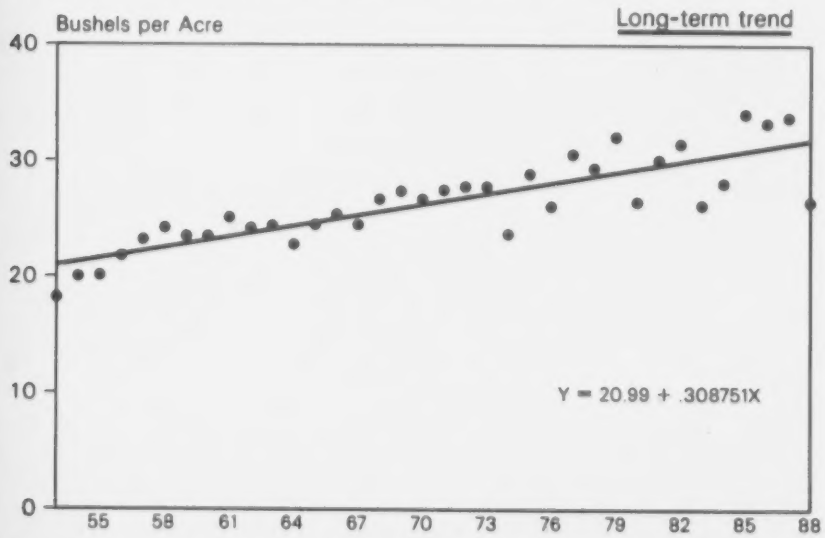

Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; FOP 3-89, March 1989; various other issues.

**Table 10. Comparative Yields in Metric Tons per Hectare of Selected Soybean Producing Countries.**

| Area | 1975-76 | 1979-80 | 1984-85 | 1985-86 | 1986-87 | 1987-88 | Prelim. 1988-89 |
|---|---|---|---|---|---|---|---|
| U.S. | 1.94 | 2.16 | 1.89 | 2.29 | 2.24 | 2.27 | 1.80 |
| Canada | 2.32 | 2.37 | 2.26 | 2.47 | 2.50 | 2.75 | 2.15 |
| Argentina | 1.60 | 1.80 | 2.06 | 2.20 | 2.08 | 2.14 | 1.81 |
| Brazil | 1.72 | 1.73 | 1.80 | 1.49 | 1.87 | 1.73 | 1.78 |
| Australia | 1.73 | 1.83 | 1.75 | 1.34 | 1.66 | 1.74 | N.A. |
| World | 1.65 | 1.82 | 1.73 | 1.86 | 1.90 | 1.90 | 1.67 |

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Oilseeds and Products*, FOP 4-78, April 1978; FOP 5-83, May 1983, *Foreign Agriculture Circular: World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; *Foreign Agriculture Circular: World Crop Production*, WCP 4-82, April 12, 1982; WCP 3-84, March 9, 1984; WCP 4-85, April 1985; WCP 4-86, April 1986; WCP 7-87, July 1987, *Foreign Agriculture Circular: World Agricultural Production*, WAP 1-88, January 1988; WAP 2-89, February 1989, and personal communications with officials of the U.S. Department of Agriculture, Foreign Agricultural Service.

**Figure 12. U.S. Soybean Yields in Bushels per Acre, 1953-88.**




Source: U.S. Department of Agriculture, *Agricultural Statistics 1988*; Foreign Agriculture Service, *Foreign Agriculture Circular: World Oilseed Situation and Market Highlights*, FOP 3-89, March 1989; Statistical Reporting Service, Crop Reporting Board, *Crop Production 1987 Summary*, CRPR 2-1 (88), January 1988; *Field Crops*, Statistical Bulletin No. 708, and various other issues.

# World Livestock and Poultry Meat Production Trends

World meat production since the mid-1950s has been sensitive to trends in consumer incomes of rapidly developing and industrialized nations and has been an important influence on demand for coarse grains, protein meal, and other feed ingredients. Rising consumer incomes generally brought increased production and consumption of red meat and poultry. This trend was especially evident in rapidly developing nations in the 1960s and 1970s, but has been followed by much slower growth in global meat production in the 1980s. The recent slower growth rate reflects sluggish world economic growth, health concerns and changing dietary trends. Slower expansion of meat production has been an important contributor to less rapid expansion in consumption of coarse grains and protein meal, and has been a restraint on prices of these commodities.

### Pork Production Up, Beef Down

Table 11 shows pork production trends in major producing countries during the last one and one-half decades. Preliminary projections place 1989 world production 1 percent higher than last year and 5 percent higher than in 1984. With world population expanding at about 2 percent per year, per capita production is decreasing slightly in 1989 and is expected to be modestly below the level of five years earlier. Pork production is expected to decline slightly in 1989 in Brazil, Mexico, the EC, and Poland but will likely be above the previous year's levels in the USSR, Czechoslovakia, East Germany, Hungary, Korea, and China. In contrast to slightly reduced North and South American pork production in the last decade, pork production has shown a moderate long-term upward trend in the EC and the USSR and a strong upward trend in China and other Asian nations. After a substantial reduction in East European pork production in the early 1980s in response to severe debt and financial problems, that area's production rose slightly from 1983 to 1988.

World beef production is expected to decline slightly again in 1989, with the sharpest reductions occurring in the EC, Argentina, Australia, and the U.S. (see Table 12). Global production is projected to decline 1 percent from 1988. Production at the projected level would be 1 percent above the level five years earlier, but would leave per capita consumption 9 to 10 percent below that same year because of world population growth. Brazil and India are expected to deviate slightly from 1989 trends of other major beef-producing countries, with a slight expansion in their production anticipated. Production is expected to remain about constant in the USSR in 1989. Chinese cattle slaughter will increase by about 10 percent.

### Continued Upward Trend in Global Poultry Production

Global poultry meat production and consumption have increased every year since 1979 in response to growing consumer incomes, consumer desire for more variety in diets, and a wider range of poultry meat products being made available by processors (see Table 13). World production in 1989 is projected to increase 3 percent from 1988. At that level, world production will be more than four-fifths larger than the 1974-78 average and per capita production will be up nearly 44 percent from the same time period. Increased production is expected in 1989 in most major producing areas in response to growing consumer demand.

**Table 11. Pork Production in Major World Producing Areas, 1974-78 Average, 1980, 1981, and 1985 through 1989 in Millions of Metric Tons.**

| Area | 1974-78 Average | 1980 | 1981 | 1985 | 1986 | 1987 | Prelim. 1988 | Forecast 1989 |
|---|---|---|---|---|---|---|---|---|
| U.S. | 5.9 | 7.5 | 7.2 | 6.7 | 6.4 | 6.4 | 7.1 | 7.2 |
| Other N. America | 1.5 | 1.8 | 1.7 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 |
| S. America | 1.0 | 1.2 | 1.2 | 0.8 | 1.0 | 1.3 | 1.4 | 1.3 |
| EC-12 | 9.0 | 10.3 | 10.7 | 11.2 | 11.5 | 11.7 | 12.1 | 12.1 |
| Other W. Europe | 1.1 | 1.3 | 1.1 | 1.2 | 1.2 | 1.1 | 1.1 | 1.1 |
| E. Europe | 6.3 | 6.9 | 6.6 | 6.7 | 6.8 | 6.8 | 7.2 | 7.3 |
| USSR | 5.2 | 5.2 | 5.2 | 5.9 | 5.9 | 5.9 | 6.5 | 6.7 |
| Asia (Exc. PRC) | 2.0 | 2.7 | 2.6 | 3.2 | 3.3 | 3.4 | 3.6 | 3.7 |
| Oceania | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| China (PRC) | 8.7[b] | N.A. | 11.9 | 16.5 | 18.0 | 17.0 | 18.2 | 18.4 |
| World Total[a] | 32.2 | 37.0 | 48.4 | 54.0 | 56.0 | 55.8 | 59.4 | 60.0 |

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Livestock and Poultry Situation*, FL&P 2-83, May 1983; FL&P 1-84, April 1984; *Foreign Agriculture Circular: Dairy, Livestock and Poultry Situation*, FL&P 1-85, April 1985; FL&P 1-86, March 1986; FL&P 2-86, September 1986; FL&P 1-87, September 1987; and FL&P 2-88, October 1988.
[a]Totals may not add due to rounding.
[b]Average production for 1976-80.

**Table 12. Beef and Veal Production in Major World Producing Areas, 1974-78 Average, 1980, 1981, and 1985 through 1989 in Millions of Metric Tons.**

| Area | 1974-78 Average | 1980 | 1981 | 1985 | 1986 | 1987 | Prelim. 1988 | Forecast 1989 |
|---|---|---|---|---|---|---|---|---|
| | | | | (Carcass Weight) | | | | |
| U.S. | 11.5 | 10.0 | 10.4 | 11.0 | 11.3 | 10.8 | 10.8 | 10.1 |
| Other N. America | 2.2 | 2.2 | 2.3 | 2.4 | 2.2 | 2.2 | 2.4 | 2.4 |
| S. America | 6.1 | 6.3 | 6.6 | 6.5 | 6.2 | 6.2 | 6.2 | 6.3 |
| EC-12 | 7.1 | 7.5 | 7.5 | 7.8 | 8.0 | 8.0 | 7.7 | 7.6 |
| Other W. Europe | 0.6 | 0.7 | 0.6 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 |
| E. Europe | 2.5 | 2.5 | 2.3 | 2.7 | 2.5 | 2.5 | 2.5 | 2.5 |
| USSR | 6.7 | 6.6 | 6.6 | 7.4 | 7.7 | 8.1 | 8.4 | 8.6 |
| S. Africa | 0.5 | 0.6 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| Asia (Excl. PRC and India) | 0.8 | 1.0 | 1.0 | 1.1 | 1.2 | 1.2 | 1.1 | 1.1 |
| Oceania | 2.4 | 2.0 | 1.9 | 1.8 | 1.9 | 1.9 | 2.1 | 2.1 |
| Total | 40.4 | 39.4 | 39.7 | 42.0 | 42.3 | 42.2 | 42.4 | 41.9 |

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Livestock and Poultry Situation*, FL&P 2-83, May 1983; FL&P 1-84, April 1984; *Foreign Agriculture Circular: Dairy, Livestock and Poultry Situation*, FL&P 1-85, April 1985; FL&P 1-86, March 1986; FL&P 2-86, September 1986; FL&P 1-87, September 1987; and FL&P 2-88, October 1988.

**Table 13. Total Poultry Meat Production in Major World Producing Areas, 1974-78 Average, 1980, 1981, and 1985 through 1989 in Millions of Metric Tons.**

| Area | 1974-78 Average | 1980 | 1981 | 1985 | 1986 | 1987 | Prelim. 1988 | Forecast 1989 |
|---|---|---|---|---|---|---|---|---|
| U.S. | 5.3 | 6.6 | 6.9 | 7.9 | 8.3 | 9.0 | 9.5 | 9.8 |
| Other N. America | 0.8 | 1.0 | 1.1 | 1.2 | 1.2 | 1.2 | 1.1 | 1.1 |
| S. America | 1.0 | 1.8 | 2.0 | 2.2 | 2.4 | 2.7 | 2.7 | 2.9 |
| EC-12 | 4.2 | 4.8 | 5.2 | 5.3 | 5.4 | 5.5 | 6.0 | 6.0 |
| Other W. Europe | 0.1 | 1.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| E. Europe | 1.6 | 1.9 | 2.0 | 1.9 | 2.0 | 2.0 | 2.1 | 2.1 |
| Soviet Union | 1.5 | 2.1 | 2.3 | 2.8 | 2.9 | 3.1 | 3.2 | 3.3 |
| Africa and Middle East | 0.4 | 0.6 | 0.9 | 1.6 | 1.6 | 1.7 | 1.7 | 1.9 |
| Japan | 0.9 | 1.2 | 1.1 | 1.4 | 1.4 | 1.5 | 1.5 | 1.5 |
| Other Asia and Oceania | 0.3 | 0.4 | 0.8 | 1.7 | 1.8 | 1.9 | 1.8 | 1.9 |
| Total | 16.1 | 21.6 | 22.5 | 26.2 | 27.2 | 28.8 | 29.8 | 30.7 |

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Livestock and Poultry Situation*, FL&P 2-83, May 1983; FL&P 1-84, April 1984; *Foreign Agriculture Circular: Dairy, Livestock and Poultry Situation*, FL&P 1-85, April 1985; FL&P 1-86, March 1986; FL&P 2-86, September 1986; FL&P 1-87, September 1987; and FL&P 1-88, September 1988.

# U.S. Shares of Wheat and Coarse Grain Trade Rise Substantially

The U.S. shares of global wheat and coarse grain trade increased in 1988-89 for the third consecutive year. These increases followed sharp downtrends of four years for wheat and six years for coarse grains that ended in 1985-86. For wheat, the U.S. share of global exports (excluding intra-EC trade) reached an estimated 42 percent in 1988-89, compared with 27 percent in 1985-86. The U.S. share of coarse grain trade rose to 66 percent in 1988-89, compared with 64 percent the previous year and 43 percent in 1985-86. The U.S. wheat export share reached a peak of approximately 50 percent in the early 1970s and was in an irregular downward trend from that time until 1985-86 (see Figure 13). The U.S. coarse grain export share trended up in the 1970s, surging to a peak of 71 percent in 1979-80 (see Figure 14).

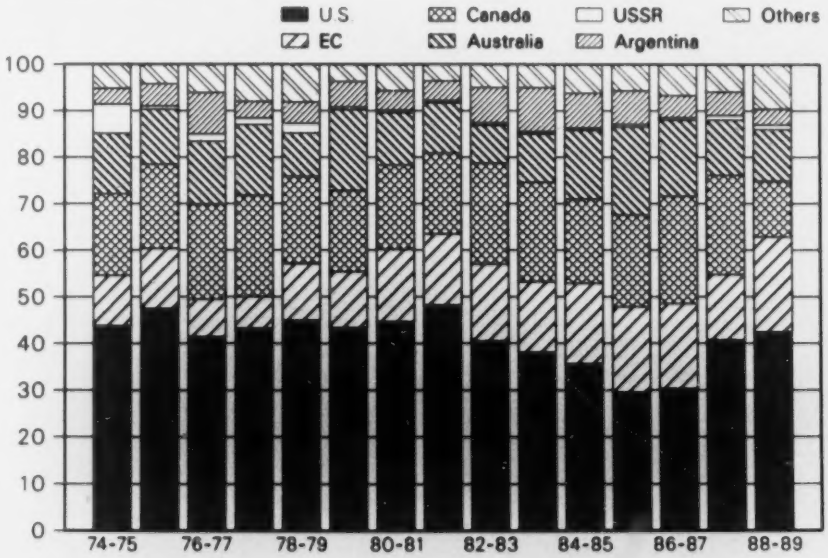
The increased U.S. trade share in the last three years reflects declines in total non-U.S. exports of wheat and coarse grain after substantial increases in the first half of the decade. The largest decline has been in non-U.S. exports of coarse grains. The trends in the early 1980s reflected large foreign grain supplies and aggressive pricing by most other exporters. The rapid decline in U.S. trade shares in the early 1980s triggered major changes in U.S. farm price support policies and export programs that were implemented in mid- to late 1986 and continued through 1989.

Competition in wheat exports was especially strong recently from the EC, Australia, and Canada, until Canada was struck by a severe 1988 drought. Canada's 1988-89 share of global wheat trade dropped to 12.9 percent from 19.8 percent in 1985-86. Among other major non-U.S. wheat exporters, Argentina's trade share decreased by 0.3 percent in 1988-89 due to adverse weather and reduced production. The EC's wheat exports now are about two-thirds as large as U.S. exports, and its share of world wheat trade (excluding intra-EC trade) has increased from 18.3 percent in 1985-86 to its present 21.6 percent share. However, the Australian market share has declined substantially in the same time period, dropping from 18.8 percent three years earlier to a preliminary estimate of 12 percent in 1988-89.

### Long-Term Trend in Wheat Trade Patterns

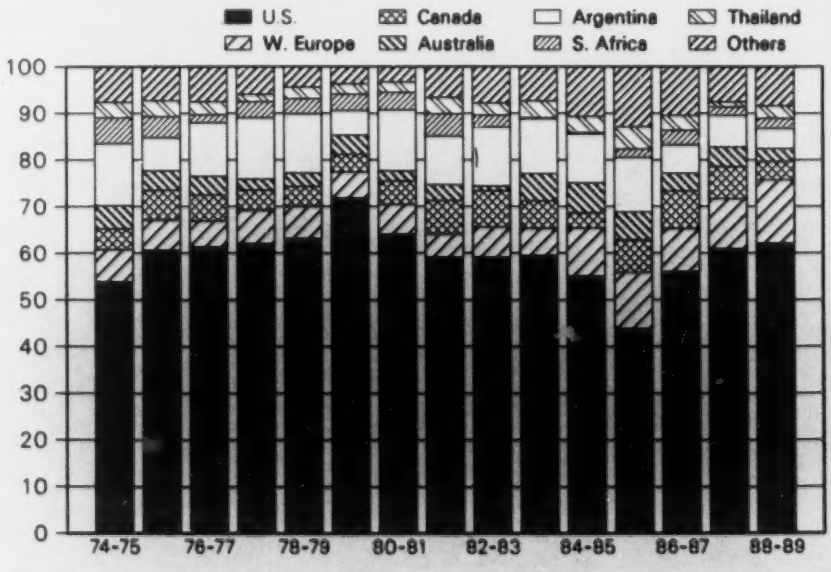
From a longer-term perspective, the U.S. share of global wheat trade increased rapidly in the early 1970s as U.S. wheat

**Figure 13. Percentage Shares of World Wheat Exports by Major Exporters, July-June 1974-75 through 1988-89.[a]**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; FG 3-89, March 1989; various other issues.
[a]From 1982-83 on, the EC is EC-12.

**Figure 14. Percentage Shares of World Coarse Grain Exports by Major Exporters, 1974-75 through 1988-89.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; FG 3-89, March 1989; various other issues. Marketing year data were accumulated on a July-June basis from 1970-71 through 1978-79. The USDA switched to an October-September fiscal year starting in 1979-80.

growers and the U.S. grain trade responded quickly to rising world demand. Profit incentives from expanded world demand, rising prices, and changing government programs brought more than a 50 percent increase in planted U.S. wheat area in only four years. A private enterprise economic system, combined with increased grain merchandising profits, quickly generated additional investments to expand U.S. grain handling and transportation capacity, enabling increased production to be moved into export markets. Along with these developments, a depreciation of the U.S. dollar increased the purchasing power of foreign buyers and the competitiveness of U.S. wheat relative to that of foreign competitors. Meanwhile, with a time lag, foreign wheat production began to rise due to increased use of fertilizer, higher-yielding varieties, and increased plantings in some areas. This was particularly true in the EC and Argentina, which both experienced steadily increased wheat export shares in the late 1970s and early 1980s. Trade shares of the other two major wheat exporters, Canada and Australia, fluctuated significantly from year to year due to a more variable climate and a resulting greater variability of production.

In the next few years, the U.S. appears likely to experience at least a slight additional increase in its wheat export share due to changing U.S. trade, grain reserve, and price support policies. The EC farm policies continue to be directed toward generating surpluses in grain production, with a price support system that encourages production, discourages consumption, and subsidizes exports. Even with substantial EC wheat feeding, a slight decrease in its internal support prices, and voluntary small-scale land set-aside program, the EC is likely to offer continued strong competition in world wheat trade. In addition, Argentina has the capability of expanding its wheat production substantially, provided weather and domestic economic conditions are stable. A continuation of current Argentine and world market conditions should encourage Argentine grain production near recent levels, although depressed grain prices relative to livestock may limit shifts in marginal land from pasture to wheat production in the next few years. Also, Canada has taken steps to expand its grain handling and transportation capacity, with the stated goal of sharply increasing its grain exports. These developments likely will continue to be met by aggressive U.S. grain export programs as will be noted in the policy section of this report.

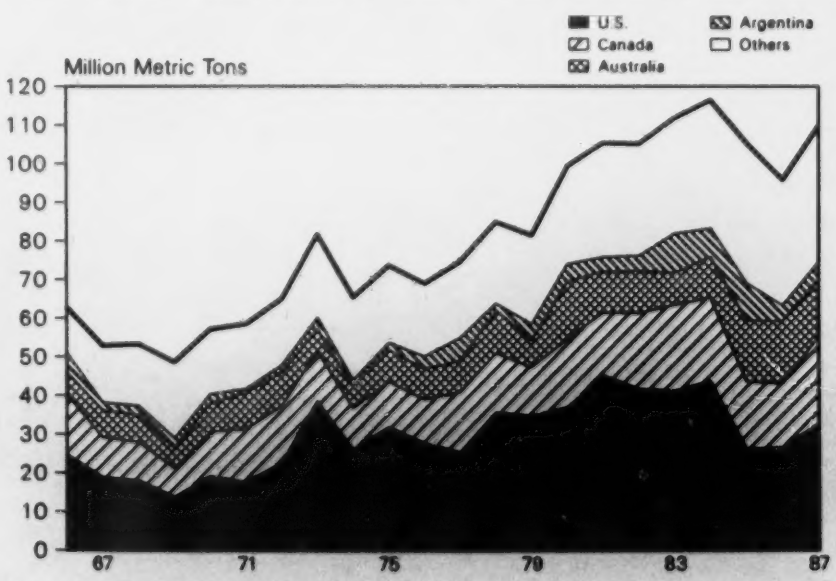
### Coarse Grain Export Shares

After temporarily surging upward in 1970-80, the U.S. share of global coarse grain trade (excluding intra-EC trade) dropped back to about the 60 percent level for the next four years. That was approximately the same trade share the U.S. obtained during the 1972-73 to 1978-79 period. The U.S. share of world coarse grain trade then declined sharply in 1984-85 and 1985-86, reaching a low of 44 percent in 1985-86, before rising during the past three years to about 66 percent in 1988-89. The 44 percent share in 1985-86 represented the lowest U.S. share of global coarse grain exports since 1971-72. Declining U.S. corn and coarse grain trade shares in the early 1980s reflected an increasing share of global exports originating in Western Europe, and continued corn and sorghum exports from China (included in the "Others" category in Figure 14). The increased U.S. coarse grain export share from 1986-87 and through 1988-89 reflected sharply lower U.S. corn prices as a result of changes in American farm and trade policies. It also reflected serious weather problems in parts of the Southern Hemisphere, Eastern Europe, and South Asia in 1987 and growing Chinese demand for grain, which reduced that country's exportable supply of coarse grains.

South Africa's corn crop was struck by severe drought in 1983, 1984, 1987, and 1988, which sharply reduced that nation's exports. Somewhat improved weather and increased 1985 and 1986 production allowed South Africa to resume modest corn exports in those years, although exports were below earlier peak levels. Its production rebounded sharply in 1989 as weather conditions turned more favorable. As shown in Figure 14, export shares of most other major coarse grain exporters including Canada, Australia, Thailand, and Argentina have varied considerably from year to year. These nations normally do not carry reserve grain stocks; thus, weather fluctuations are a major factor behind year-to-year variations in their shares of world coarse grain trade.

Figure 17 shows the dramatic rise in U.S. corn exports in the 1970s, while non-U.S. exports during the same period remained relatively stable. From 1979-80 to 1985-86, however, U.S. corn exports fell by 50 percent, while corn exports from all other nations as a group rose by over 80 percent. The sharp decline in U.S. exports brought severe financial pressures to U.S. grain producers, grain and farm supply firms, the U.S. grain transportation industry, and port elevators. Since 1985-86, corn exports by non-U.S. exporters as a group have fallen by about one-fourth, due largely to reduced exports from China, Thailand, Australia, Canada, and Argentina.

**Figure 15. World Wheat Exports by Country of Origin, Calendar Years 1966-87.**




Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

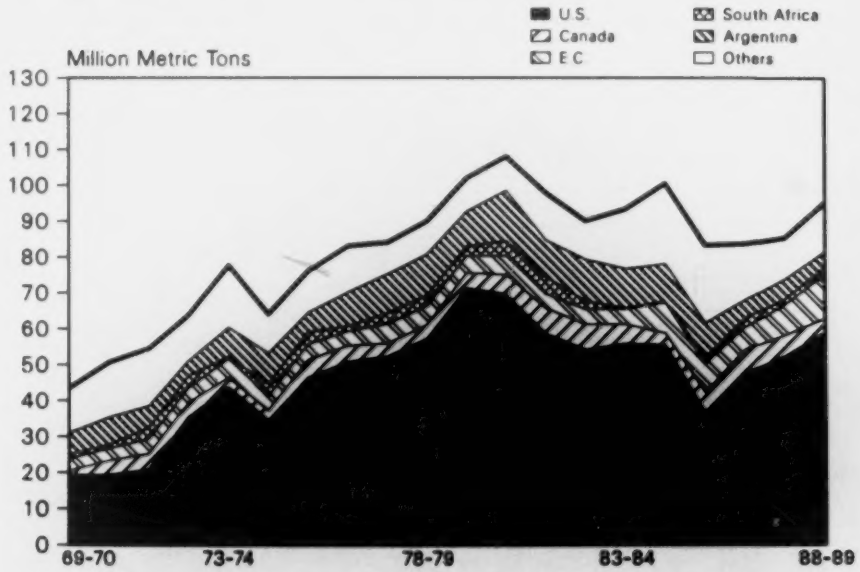
Prospects for the U.S. share of coarse grain exports in the next few years remain somewhat uncertain and will depend on: (1) U.S. price support, grain reserve, and acreage control policies; (2) exchange rates of the U.S. dollar against foreign currencies; (3) Soviet grain production and consumption; (4) world economic growth rates; and (5) weather in major U.S. and foreign coarse grain exporting areas. At this writing, barring prolonged weather problems, demand indicators point to slightly increased global coarse grain exports through the mid-1990s. If this proves correct, U.S. corn and coarse grain exports in the next few years are likely to continue to face significant but less intense foreign competition than in the mid-1980s. Changing U.S. farm policies should help to at least slightly increase the U.S. share of world coarse grain trade from the already strong recovery that has occurred through 1988-89.

In the event of a sharp upturn in world trade, U.S. corn and coarse grain exports almost certainly could be increased more rapidly than those of foreign competitors, with a resulting sharp increase in the U.S. trade share. Unlike most other coarse grain exporting nations, the U.S. has substantial excess handling and exporting capacity, a large amount of land currently being idled from production, and modest reserve grain stocks that could be used to meet expanding world demand.

Figures 16 and 17 illustrate that U.S. corn and coarse grain exports continue to be of major importance to foreign livestock industries. U.S. corn exports now account for 8 out of every 10 tons traded in world markets and slightly more than half of all coarse grains moving into international trade. These grains are used primarily for livestock and poultry feed in industrial and rapidly developing nations.

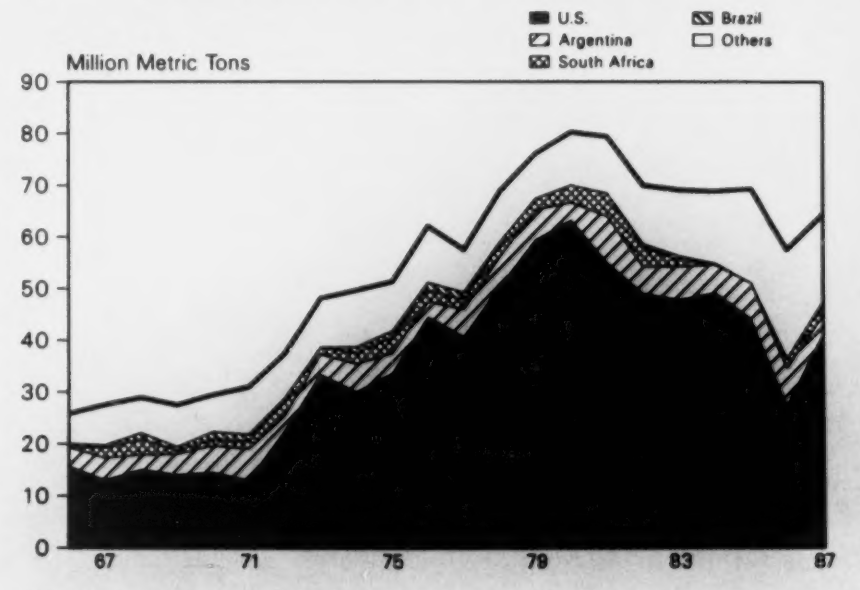
Other major coarse grain exporters include Argentina, France, Canada, South Africa, and Thailand. Despite policies intended to encourage Brazil to return to its former corn export position of the 1960s and early 1970s, it has remained a net corn importer most of the time during the 1980s. Recent performance suggests Brazil is likely to have difficulty maintaining a net export position in corn on a consistent basis in the next few years. Restraints on Brazilian production potential include more attractive alternatives in competing crops, high costs of fertilizer and other purchased inputs, and difficulties of accumulating capital and financing production in a high-inflation economy.

**Figure 16. World Coarse Grain Exports by Country of Origin, Trade Years 1969-70 through 1988-89.[a]**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; FG 3-89, March 1989; various other issues.
[a]Trade data in this table are on a July-June trade year through 1980-81. From 1980-81 on, the trade year is October-September.
[b]Trade data as expressed in this table exclude intra-EC trade.

**Figure 17. World Corn Exports by Country of Origin, Calendar Years 1966-87.**




Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

# Soybean and Soybean Product Trade Shares

**Soybeans**

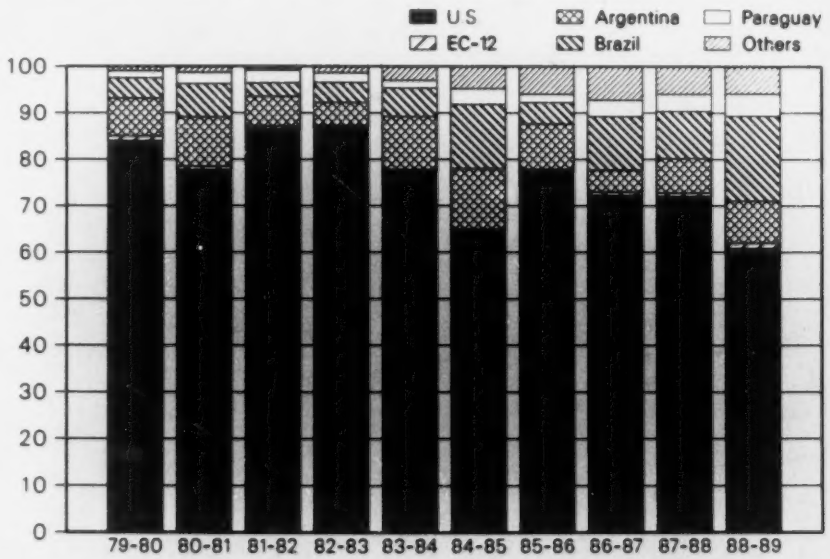
The U.S. share of global soybean trade has been somewhat variable in recent years. It declined substantially in 1983-84 and 1984-85, turned temporarily upward in 1985-86, but declined again in 1986-87 and 1988-89 (see Figure 18). Preliminary data place the current U.S. share at 61 percent, down from an average of slightly over 80 percent in the 1975-76 through the 1983-84 period. The recent decline in the U.S. share of global soybean trade has resulted from increased exports by Argentina, Brazil, and Paraguay. Other contributing factors behind the decline include the strong U.S. dollar in the 1981-89 period relative to South American currencies and U.S. price support programs that have tended to restrict the competitiveness of U.S. soybeans in international markets and in competition with other major crops for U.S. cropland.

U.S. soybean and soybean meal exports are affected by a wide range of factors. For example, much of the decline in U.S. and world exports in 1983-85 reflected reduced demand for soybeans and soybean meal in Western Europe. Factors contributing to that area's reduced demand included: (1) an aggressive EC program to reduce surplus dairy production, (2) increased wheat feeding with a resulting decline in protein meal needs since wheat has a higher protein content than corn (maize), (3) a stabilizing of other EC livestock and poultry production, (4) large imports of U.S. corn gluten feed and meal as an alternative protein source, and (5) a sharp increase in EC oilseed production. In addition, the U.S. dollar, at times, has placed U.S. soybeans and meal at a competitive disadvantage relative to foreign supplies, and debt problems have restrained demand growth in Eastern Europe and developing nations. These restraints on world soybean exports eased somewhat from 1985-86 through 1987-88, but re-emerged in 1988-89 as the cost of imported soybeans and soybean meal increased sharply in response to a major U.S. drought.

U.S. price support programs and the extent of growth in foreign demand for beans and meal will strongly influence the U.S. soybean trade share in the next few years. With relatively modest growth in world demand and no major changes in price supports, the U.S. trade share is expected to remain under pressure from South American competition. But with accelerated demand growth and/or substantially restructured U.S. price support programs, U.S. producers should be able to expand production more quickly and aggressively than their foreign counterparts, increasing the U.S. share of world trade.

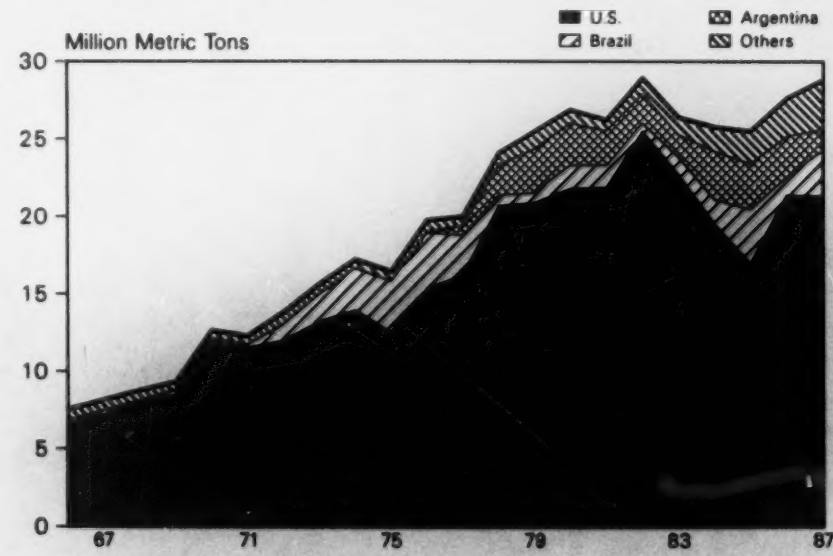
Figure 19 shows the long-term trend in exports of soybeans by the U.S. and other exporting nations including the expanded South American exports and sizable year-to-year fluctuations in global exports. World soybean trade has experienced some brief periods of decline, but has shown a

**Figure 18. Percentage Shares of World Soybean Exports by Major Exporters, October-September 1979-80 through 1988-89.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; FOP 3-89, March 1989; various other issues.

**Figure 19. World Soybean Exports by Country of Origin, Calendar Years 1966-87.**




Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

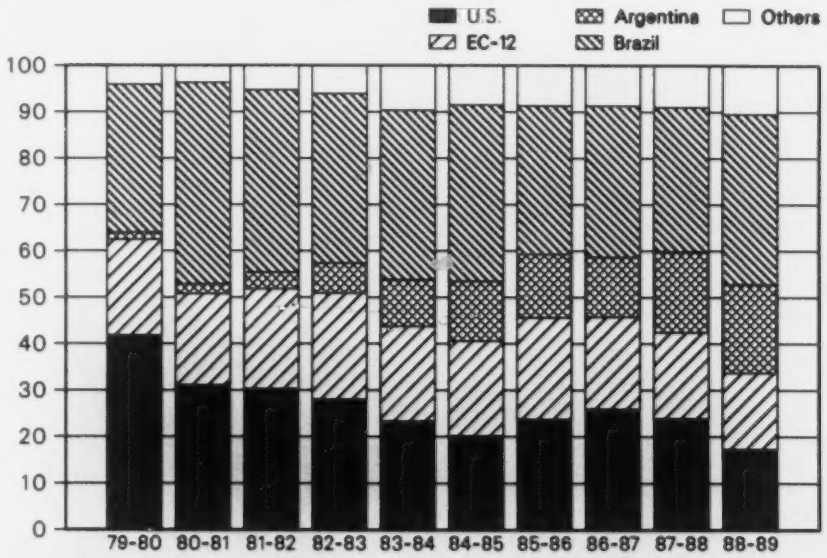
remarkable capacity to rebound when global economic growth resumes its upward trend or when supplies recover from drought-reduced levels. Rising consumer incomes are closely linked with increased demand for livestock and poultry products and have a strong tendency to generate increased demand for protein meal. Soviet agricultural policies, including its priority on protein meal imports are additional influences on future export trends (see USSR section of this report). Given that the average protein content of Soviet livestock and poultry rations is far below Western standards, and considering the agricultural background and training of the current Soviet leadership, it appears likely that soybean and/or protein meal imports by the USSR will increase significantly in the next several years.

### Soybean Meal

The U.S. share of world soybean meal exports temporarily stabilized from 1985-86 to 1987-88, after trending downward in the early part of the decade (see Figure 20). However, the U.S. share of global soybean meal trade again dropped sharply in 1988-89 as a result of drought-reduced U.S. supplies and a record South American soybean crop. While over three-fifths of the soybeans traded in world markets are produced in the U.S., less than one-fifth of the soybean meal traded in world markets originates from U.S. processing plants. With strong foreign competition and sluggish global demand for protein meal, U.S. soybean meal exports in 1984-85 dropped below those of both the EC and Brazil for the first time. Since then, U.S. exports have moved moderately above those for the EC but are only about half as large as Brazil's soybean meal exports. In addition, Argentina has expanded its soybean processing capacity in recent years and additional capacity expansions are occurring there. Thus, Argentina's share of world soybean meal trade increased sharply in the past five years and is likely to increase further in the years ahead. A high percentage of the soybeans processed in the EC are of U.S. origin, since climatic limitations have kept that area's domestic production at extremely low levels. Spain and Portugal account for much of the soybean meal exports in the "Others" category of Figure 20 for years prior to 1986-87. Since 1986-87, they are included in the "EC" category. These two nations joined the EC on January 1, 1986.

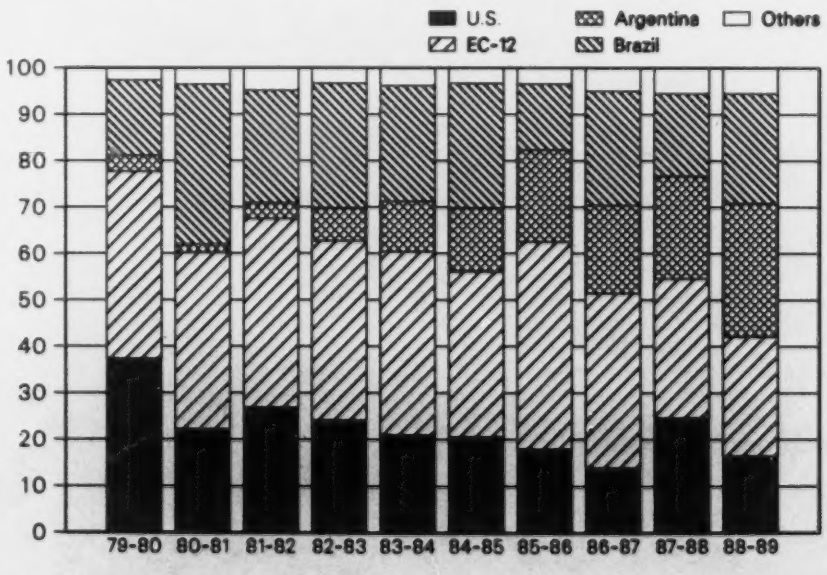
From a longer-term perspective, Brazil's share of world soybean meal exports fluctuated from year to year due to varia-

**Figure 20. Percentage Shares of World Soybean Meal Exports by Major Exporters, October-September 1979-80 through 1988-89.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; FOP 3-89, March 1989; various other issues.

**Figure 21. Percentage Shares of World Soybean Oil Exports by Major Exporters, October-September 1979-80 through 1988-89.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; FOP 3-89, March 1989; various other issues.

tions in its production, but with a modest upward trend. However, the largest part of the decline in the U.S. soybean meal trade share since the late 1970s has come primarily from the EC (including Spain and Portugal) and from Argentina. Increased trade shares by these areas reflect their governments' policies, which are designed to encourage exports of value-added products such as soybean meal and soybean oil. Value-added exports enable processing nations to benefit from increased domestic employment and to retain any profits resulting from processing operations. Policies used to encourage such trade patterns include larger export taxes on beans than on bean products in South America and modest import taxes on soybean oil in the EC nations.[10]

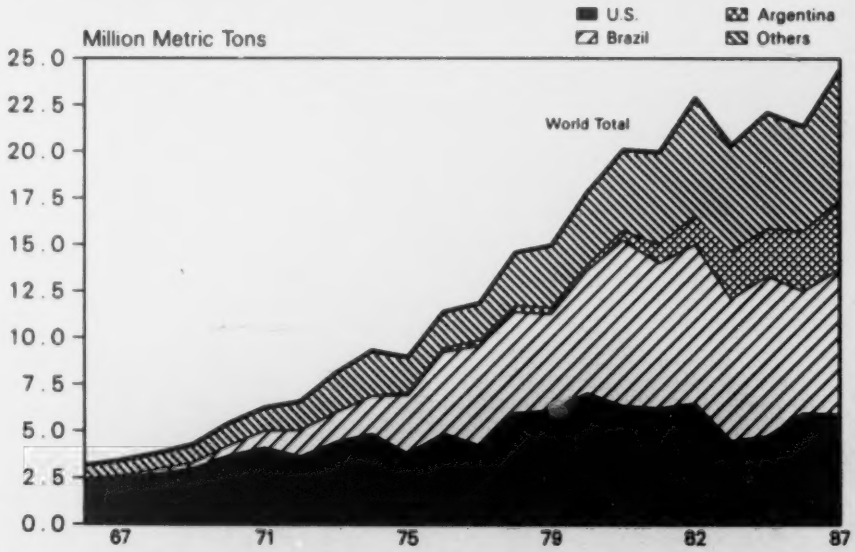
Trade policies of these competing meal exporting nations are strongly entrenched. With excess world processing capacity, the U.S. soybean processing industry is likely to face intense competition in its efforts to maintain or expand its share of global soybean meal trade. In contrast to U.S. soybean export shares, the excess foreign processing capacity would make it difficult for the U.S. meal trade share to rebound sharply even in case of a strong recovery in world soybean meal demand.

### Soybean Oil

The U.S. share of global soybean oil exports has followed a pattern similar to that for soybean meal, except that the soybean oil share declined moderately in 1986-87, rebounded sharply in 1987-88 with expanded U.S. government export assistance programs and then declined again in 1988-89 with increased foreign competition (see Figure 21). The U.S. ranked fourth in soybean oil exports in 1988-89, behind Brazil, Argentina, and the EC. Argentina's share has increased rapidly since the early 1980s as its soybean production and processing capacity expanded. Competition from EC and Brazilian processing industries will depend heavily on trade policies of those areas and on trends in Brazilian soybean production and domestic soybean oil consumption. With no major changes in trade policies, U.S. soybean oil exports appear likely to face continued strong competition in the years ahead.

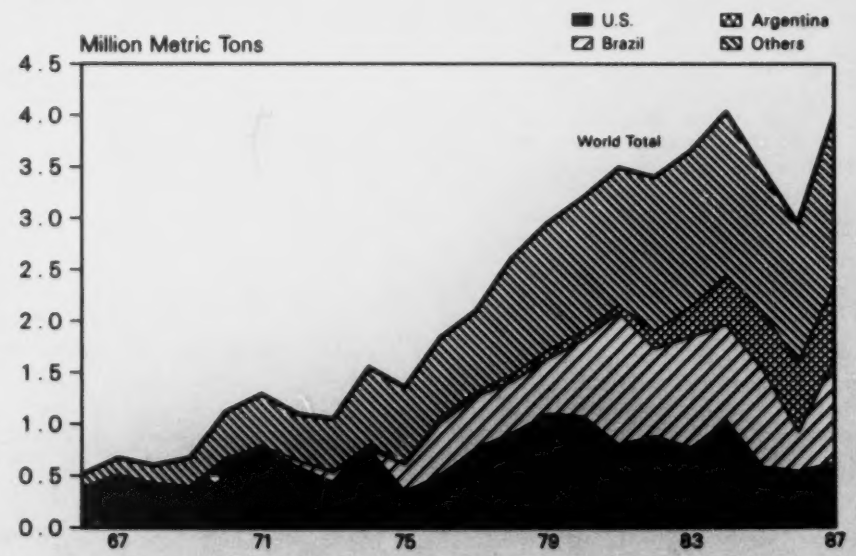
Figures 22 and 23 show exports of soybean meal and oil by major exporters since the mid-1960s. World soybean meal and oil trade patterns show only slightly increased U.S. exports over this time period and sharply expanded exports by Brazil, Argentina, and other nations. The "Others" categories in Figures 22 and 23 consist mainly of the EC (including Spain and Portugal). U.S. and South American soybeans are processed in EC countries and a portion of the resulting meal and oil production is re-exported. This pattern indicates the U.S. soybean processing industry has been denied participation in much of the growth in world demand for its value-added exports. It also helps explain increasing concern in the U.S. about foreign oilseed processing policies.

**Figure 22. World Soybean Meal Exports by Country of Origin, Calendar Years 1966-87.**




Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

**Figure 23. World Soybean Oil Exports by Country of Origin, Calendar Years 1966-87.**




Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.

# Trade Shares in Livestock Product Exports

### Beef and Veal Exports

The U.S. share of world beef and veal exports has increased over the past 15 years and the upward trend continued in 1989 as a result of liberalization of Japanese beef import policies. U.S. beef and veal exports now represent nearly 8 percent of world trade. As shown in Figure 24, that compares with a U.S. trade share of only 0.8 percent in 1973. Despite the upward trend, U.S. beef exports are much smaller than exports from Australia, New Zealand, Brazil, and the EC. The U.S. beef exports in 1989 are expected to be about equal to those from Argentina.

In mid-1989, the U.S. and Japan entered into a beef and citrus agreement that permits a significant expansion in Japanese beef imports in the next few years. Japan's global beef import quota will increase from 214,000 metric tons in fiscal 1987-88 to 274,000 tons in 1988-89, 334,000 tons in 1989-90, and 394,000 tons in 1990-91. That amounts to an 84 percent increase in the beef import quota by 1990-91. In April 1991, all quantitative restrictions on Japanese beef imports will be removed. During the 1988-91 period, Japan's beef imports will have a 25 percent tariff with reductions in other import charges. In April 1991, the tariff is scheduled to rise to 70 percent with reductions to 60 percent in 1992-93 and 50 percent in 1993-94.[11] These changes are expected to sharply increase Japanese beef imports, and a large part of the increased imports is expected to be supplied by the U.S. and Australia. In addition, U.S. beef exports to Canada have trended strongly upward in recent years and have contributed to growth in its total exports. The U.S. is the leading supplier of imported beef to Canada and accounted for approximately 38 percent of all Canadian beef imports in 1988. In 1980, the U.S. supplied only 11 percent of Canada's beef imports.[12] Major non-U.S. exporters of beef in order of size include the EC, Australia, Brazil, New Zealand, Argentina, and Uruguay. The substantial long-term growth in EC's share of world beef exports since 1973 has come largely at the expense of Argentina, Uruguay, and New Zealand. Sizable yearly fluctuations in exports from Australia and Argentina reflect an unstable climate in those areas, with herd liquidation tending to increase supplies and depress prices during drought years. Conversely, when pasture and range conditions are favorable, producers tend to retain animals to rebuild herds, resulting in a temporary decline in beef supplies and exports. Australia was in a herd reduction phase from 1986 to early 1988, but is expected to expand cattle inventories in the next few years if favorable rainfall and pasture conditions continue. Argentina's long-term decline in export share at least partially reflects that country's increased emphasis on wheat, corn, sorghum, sunflowerseed, and soybean exports as sources of foreign exchange earnings to help service its large external debt, and a resulting decrease in the amount of land devoted to pasture.

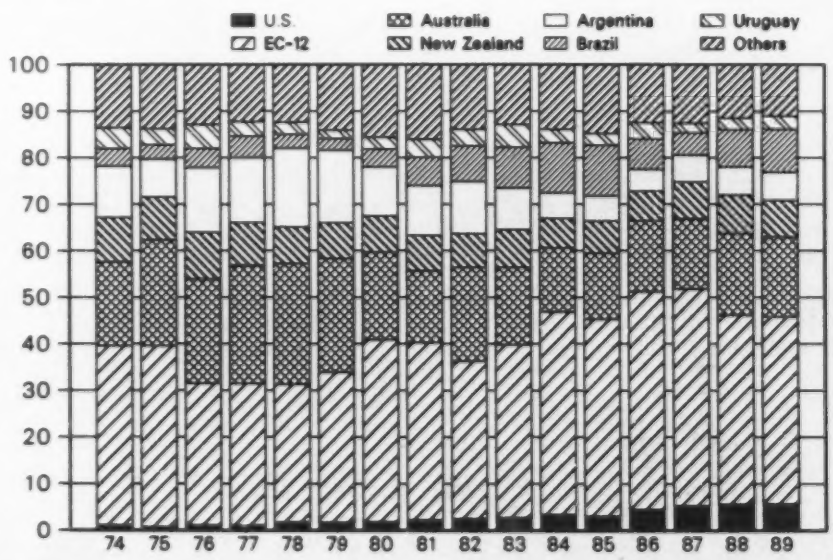
### Pork Export Shares

The EC also is the world's largest pork exporting area, as shown in Figure 25. If intra-EC exports are included, its exports since 1970 have accounted for 61 to 77 percent of world pork trade. Excluding intra-EC trade, its share of global pork exports in recent years fluctuated from 16 to 24 percent. But, the EC's share of global exports has trended slightly downward since the mid-1970s. During the same period, Canadian, Chinese, and East European export shares have increased slightly. U.S. pork export shares reached a peak in 1976 and declined gradually until 1987, partly because of strong European and Canadian competition. The U.S. share of world pork exports is expected to be approximately 1.4 percent in 1989, less than one-third as large as the record 1976 trade share. While some growth in U.S. pork exports is possible in future years if the U.S. dollar maintains a realistic level in foreign currency markets, U.S. producers continue to face import barriers in other countries and strong competition from other pork exporting nations.

### Poultry Meat Export Shares

As shown in Table 14, the U.S. share of world poultry meat exports rebounded in the late 1980s after being in a downward trend from 1981 through 1985. Poultry meat exports from the U.S. in 1987 accounted for approximately 26 percent of the world total, up from 20 percent in 1980. The U.S. poultry meat export share is expected to increase slightly in 1989, with competition from the EC, Brazil, and Eastern Europe remaining strong. Since 1985, global exports have trended modestly upward. Impediments to U.S. poultry meat exports from an over-valued dollar have diminished somewhat since the mid-1980s and helped the U.S. to expand its market share. But, at

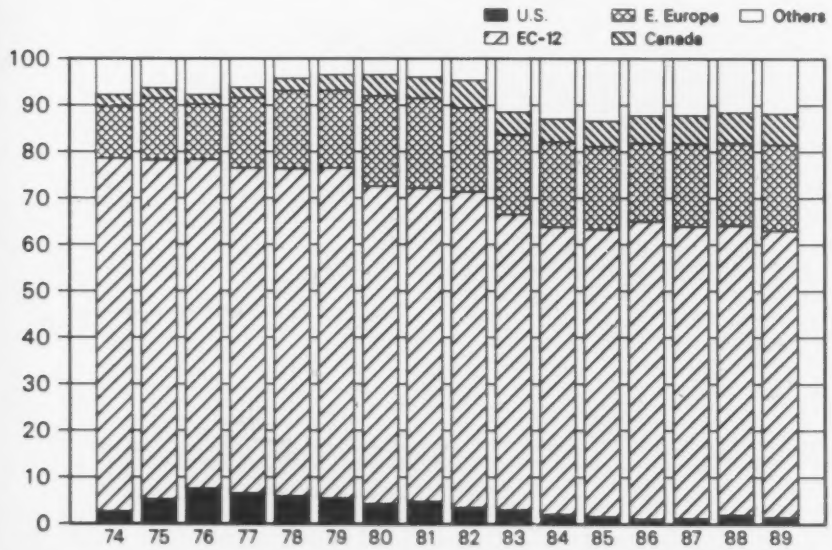
**Figure 24. Percentage Shares of World Beef and Veal Exports by Major Exporters, 1974-89 Calendar Years.[a]**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Livestock and Poultry Situation*, FL&P 1-87, September 1987; FL&P 2-88, October 1988; various other issues; *Foreign Agriculture Circular: Livestock and Meat*, FLM 2-81, February 1981; various other issues.

[a]Includes intra-EC trade. From 1983 on, the EC is EC-12.

**Figure 25. Percentage Shares of World Pork Exports by Major Exporters, 1974-89 Calendar Years.**[a]




Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Livestock and Poultry Situation*, FL&P 1-87, September 1987; FL&P 2-88, October 1988; various other issues; *Foreign Agriculture Circular: Livestock and Meat*, FLM 2-81, February 1981; various other issues.
[a]Includes intra-EC trade.

**Table 14. World Poultry Meat Exports by Selected Exporters, 1974-78 Average, 1979, 1981, and 1985 through 1989 in Thousands of Metric Tons.**

| Area | 1974-78 Average | 1979 | 1981 | 1985 | 1986 | 1987 | Prelim. 1988 | Proj. 1989 |
|---|---|---|---|---|---|---|---|---|
| U.S. | 148 | 228 | 375 | 211 | 276 | 363 | 337 | 326 |
| Brazil | 23 | 81 | 295 | 274 | 226 | 216 | 181 | 181 |
| EC-12[a] | N.A. | 271 | 465 | 346 | 343 | 384 | 390 | 395 |
| E. Europe | 1,173 | 196 | 289 | 302 | 320 | 401 | 399 | 414 |
| Others | 33 | 42 | 46 | 100 | 134 | 150 | 159 | 172 |
| Total[a] | N.A. | 818 | 1,470 | 1,233 | 1,299 | 1,514 | 1,466 | 1,488 |
| Total[b] | 853 | 1,156 | 1,836 | 1,662 | 1,791 | 2,023 | 2,009 | 2,056 |

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Livestock and Poultry Situation*, FL&P 2-83, May 1983; *Foreign Agriculture Circular: Dairy, Livestock and Poultry Situation*, FL&P 1-85, April 1985; FL&P 1-86, March 1986; FL&P 2-86, September 1986; FL&P 1-87, September 1987; and FL&P 1-88, September 1988.
[a]Excludes Intra-EC trade.
[b]Includes Intra-EC trade.

the same time, debt pressures and high real interest costs encouraged Brazil and Eastern Europe to place greater emphasis on value-added exports, including poultry and poultry products, as a means of earning foreign exchange. Also, a shift in dietary patterns from red meat to poultry meat in the U.S. temporarily reduced the availability of poultry meat for export. But in 1987, 1988, and 1989 U.S. poultry production expanded sharply enough to supply strong growth in both domestic and export markets. The shift in U.S. dietary patterns reflects consumer concern over cholesterol in red meat as a contributor to heart disease and acceptance of an increased variety of convenience-type poultry products that can be prepared quickly for consumption. These forces likely will continue to influence future patterns of world trade in poultry meat.

# Developments in Soviet Agriculture and U.S. Trade Relationships

With large year-to-year fluctuations in its grain production and imports, the Soviet Union is a major influence on the volume of grain traded in world markets and has considerable impact on world grain prices. The extremes in year-to-year changes in its grain production since the early 1970s have ranged from slightly over an 80 million metric ton (3 billion bushel) increase to nearly a 60 million metric ton (2.3 billion bushel) decrease. As an example of the potentially volatile Soviet role in world markets, approximately one-fourth of the world grain trade and one-third of all U.S. corn exports in 1984-85 were accounted for by Soviet imports. But the next year, its imports accounted for only 17 percent of global grain trade and about one-fifth of all U.S. corn exports. The Soviet Union's significance as a price-influencing factor is caused by the size and variability of its imports and by its centralized grain purchasing system. Import decisions in the USSR are made by a small group of government officials who can contract for the nation's entire yearly grain import needs in a very short time if they wish to do so. This centralized purchasing system creates the potential for an ever-present element of surprise in Soviet buying patterns.

The USSR's initial entry into world grain markets in the early 1970s as a large and continuous grain importer was an example of this surprise element, with Soviet buyers dealing with several large grain firms and failing to disclose the total size of their import needs to any one firm or to U.S. Department of Agriculture officials in charge of the wheat export subsidy program. Since that time, grain merchandisers throughout the world have monitored Soviet weather, political developments, freight bookings, and other factors that might reveal purchasing patterns. The importance of this potential surprise element stands out when the USSR purchasing system is contrasted with that of Japan, another large grain importer. Japan's private enterprise system spreads purchasing decisions over a large number of individual decision makers. The element of potential surprise is much less significant than with the Soviet Union. In addition, Japan's grain import levels are relatively stable from year to year. Consequently, little or no world grain price reaction usually follows Japanese purchase announcements.

### 1988-89 Soviet Coarse Grain Imports Up Sharply but Well Below Record

With weather-reduced coarse grain production, record or near-record livestock and poultry production, and low grain carryover stocks, Soviet grain imports in 1988-89 increased to 39 million metric tons (July-June trade year), up seven million metric tons, or 21 percent, from a year earlier. Previous records in Soviet grain imports were 55 million metric tons in 1984-85, and 46 million tons in 1981-82. Soviet coarse grain production in 1988 fell 14 percent or 16 million metric tons below production a year earlier due to drought and greater than normal unharvested area. Its 1988 wheat production, however, was about 1 percent above a year earlier. With USSR wheat quality being much higher than in the previous season, its wheat imports dropped 28 percent or six million metric tons below imports a year earlier. According to early indications, total Soviet grain production in 1989-90 may be up modestly from a year earlier, along with a modest decline in both wheat and coarse grain imports. Its winter wheat crop, which normally accounts for approximately one-third of the country's total grain harvest, reportedly was above a year earlier, and, as of fall 1989, its prospects for spring-planted crops looked better than in 1988.

### Longer-Term Grain Production Prospects

Figure 26 shows large year-to-year variability and little upward trend in Soviet grain yields since the early 1970s. Future trends in Soviet grain imports will depend heavily on its success in reducing annual yield variability and in overcoming long-standing difficulties in improving the productivity of its grain sector. Factors contributing to these two problems are complex and include climatic limitations from a grain belt that lies largely on a latitude similar to that of the Canadian prairie provinces. Its climate includes a short growing season, substantial risk of frost and drought

**Table 15. Soviet Grain, Soybean, and Soybean Meal Importing Patterns in Millions of Metric Tons, Selected Years 1975-76 through 1988-89.**

| | 1975-76 | 1976-77 | 1977-78 | 1983-84 | 1984-85 | 1985-86 | 1986-87 | 1987-88 | Prelim. 1988-89 |
|---|---|---|---|---|---|---|---|---|---|
| Wheat Imports[a] | 10.1 | 4.6 | 6.6 | 20.5 | 28.1 | 15.7 | 16.0 | 21.5 | 15.5 |
| Coarse Grain Imports[a] | 15.6 | 5.7 | 11.7 | 11.5 | 27.3 | 13.6 | 10.8 | 10.7 | 23.5 |
| Total Imports, Wheat and Coarse Grains | 25.7 | 10.3 | 18.3 | 32.0 | 55.4 | 29.3 | 26.8 | 32.2 | 39.0 |
| Percentage from U.S. Origin[b] | 54% | 72% | 78% | 44% | 28% | 24% | 15% | 42% | 46% |
| Soybean Imports | 1.7 | 1.5 | 0.9 | 1.0 | 0.9 | 2.2 | 1.5 | 1.4 | 0.8 |
| Percentage from U.S. Origin[b] | 18% | 62% | 93% | 50% | 0% | 68% | 5% | 58% | 38% |
| Soybean Meal Imports | 0.0 | 0.1 | 0.0 | 0.8 | 0.6 | 0.5 | 2.9 | 3.0 | 4.0 |
| Percentage from U.S. Origin[b] | 0% | 100% | 0% | 0% | 0% | 0% | 0% | 44% | 34% |

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Grains* FG 23-82, July 16, 1982; FG 10-83, April 12, 1983; *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 4-87, April 1987; FG 7-87, July 1987; FG 3-88, March 1988; FG 8-89, August 1989; *Foreign Agriculture Circular: World Oilseed Situation and Highlights*, FOP 4-87, April 1987; FOP 4-88, April 1988; FOP 8-89, August 1989; U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987; November-December 1988; *Foreign Agriculture Circular: Oilseeds and Products*, FOP 4-81, March 1981; FOP 9-82, July 1982; FOP 4-83, April 1983; FOP 6-84, June 1984; U.S. Department of Agriculture, Agricultural Marketing Service (Independence, Mo.) *Grain and Feed Market News*, various issues; U.S. Department of Agriculture, Foreign Agriculture Service, *U.S. Export Sales*, June 1982, various issues and personal communication with officials of the U.S. Department of Agriculture, Foreign Agricultural Service.

[a]July-June trade years.

[b]Imports from U.S. origin are on October-September marketing years.

damage, and periodic problems from excessive rain or snow during the harvesting and winter wheat planting seasons.

Along with climatic limitations, Soviet agriculture faces serious coordination problems from its state-controlled agricultural system. These problems are evident from reports of a chronic lack of spare parts and disabled machinery during key fieldwork periods; inadequate crop drying, storage, and transportation equipment at harvest; harvesting and planting delays as farm workers wait for instructions on the individual day's activities; lack of the proper type and quantities of fertilizer at the time it is needed; and similar problems with other inputs. With the USSR's short growing season, optimum timing and coordination of all operations is essential for an efficient crop production sector.

While substantial time likely will be required to achieve improved coordination in the Soviet crop sector, the nation is shifting in that direction. The Soviet presidency is now held by Mikhail Gorbachev, a relatively young man trained in agronomy and experienced in USSR agriculture. Massive Soviet grain and oilseed imports have absorbed foreign exchange that otherwise could have been used to improve industrial output, so a strong incentive exists for the USSR to deal with lagging productivity in crop production. According to a U.S. Department of Agriculture publication, the Soviet administration is attempting to streamline and optimize the current agricultural system, rather than make radical changes. In the streamlining process, a move is under way to improve labor productivity through a contract system where worker remuneration is linked more closely with output.[13] The nation also is experimenting with long-term leases of farmland to farm families and a pilot program of selling shares in state farms to farm workers, with return on the shares dependent on the economic performance of the farm.[14] The Soviet Union also is emphasizing an "Intensive Technology" program involving use of improved varieties and increased use of fertilizers, herbicides, and other inputs. About one-third of its grain area was in the Intensive Technology program in 1987, up from 16 percent two years earlier, according to an International Wheat Council report.[15] That report also stresses a need for increased Soviet grain drying, storage, and handling capacity to cut the excessively high post-harvest losses to benefit from the Intensive Technology production gains.[16]

Other Soviet policies aimed at improving crop production include plans for large investments in a long-term program to drain approximately 20 million hectares of potential cropland by the year 2,000 and to extend irrigation to an additional 30 to 32 million hectares.[17] Available investment funds and costs of the projects will determine whether these goals are attained. Investment plans also call for expanded grain storage and handling facilities to reduce spoilage losses, and increased production of fertilizer and farm machinery.[18] Soviet grain and oilseed yields likely will trend upward in the years ahead. However, the performance of the last 15 years suggests that changes probably will be gradual, and that the USSR will likely continue its large and variable pattern of grain imports for the next several years.

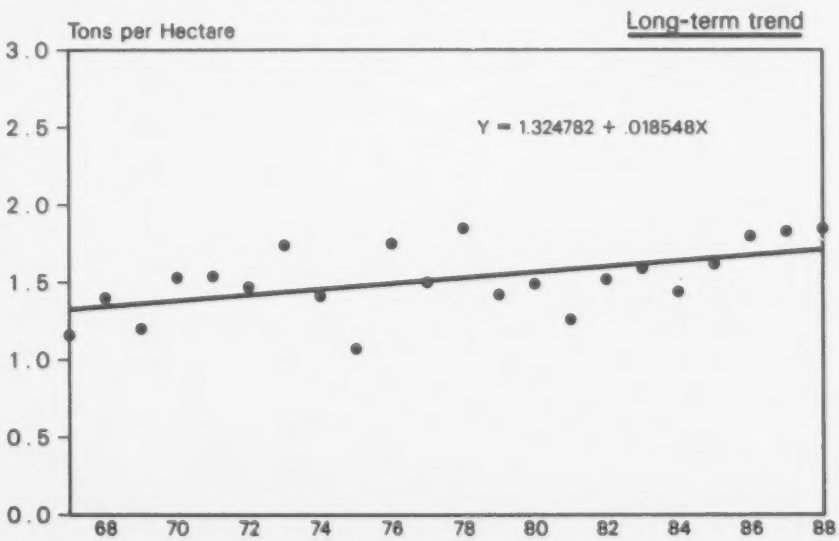
### Oilseed Prospects

Prospects for Soviet oilseed and/or oilseed products are less clear than those for grain. Official plans call for sharply increased oilseed production, but so far, little progress has been made in that direction (see Table 16). Despite increased protein meal imports, Soviet livestock rations still contain extremely low protein contents by Western standards. Sharp increases in protein meal imports could enable Soviet agriculture to more efficiently use limited grain supplies and also could improve productivity of its livestock and poultry sectors. For these reasons, the current Soviet leadership appears to be placing increased priority on large oilseed and/or protein meal imports in the years ahead. This shift in priority began in mid-1987 with sizable purchases of South American soybeans and meal and was followed by unusually large purchases of U.S. soybeans and soybean meal in late 1987 and 1988. Some analysts view these trends cautiously because in the early 1980s the Soviets experimented with increased protein meal imports for one year, but allowed imports in following years to decline to previous levels.[19] However, greater knowledge of how to transport, process, and use soybean meal in livestock and poultry feeding now may be positioning the Soviet Union for further increases in its soybean meal and/or soybean imports in the years ahead.

### Livestock Sector

In the USSR livestock sector, aggregate livestock numbers have expanded slowly since 1985, with preliminary estimates of 1987 total beef, pork, and poultry meat production reaching a record 18.1 million

**Figure 26. Trend in USSR Grain Yields in Metric Tons per Hectare, 1967-88.**




Source: U.S. Department of Agriculture, Economic Research Service, *USSR Outlook and Situation Report*, RS 87-4, May 1987; RS 88-2, May 1988; Foreign Agricultural Service, *Foreign Agriculture Circular: Grains*, FG 25-76, October 7, 1976; FG 4-83, February 15, 1983; FG 7-85, May 1985; *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 4-87, April 1987; FG 3-88, March 1988; Statistical Reporting Service, *USSR Grain Statistics, National and Regional 1955-1975*, Statistical Bulletin No. 564.

metric tons, 2 percent above levels a year earlier.[20] Milk and egg production expanded by 2 and 4 percent, respectively.[21] Similar increases in all five categories are expected in 1989. Use of grain in livestock and poultry feed in the USSR has fluctuated in a relatively narrow range in recent years, despite increased meat, egg, and milk production. Thus, feed conversion efficiency of the Soviet livestock sector appears to be trending upward. Further increases in feed conversion efficiency appear likely in the years ahead through animal breeding and genetics, improved animal health and nutrition, better management, and increased protein content in rations.

### U.S.-USSR Grain Agreement

The current U.S.-USSR Grain Trade Agreement went into effect in October 1983 and runs through December 31, 1990. It requires the United States to make available and the USSR to purchase a combined minimum of nine million metric tons annually of U.S. corn and wheat, divided about equally between corn and wheat. The agreement allows soybeans or soybean meal to be substituted for grain at the rate of 0.5 million metric tons of soybeans or soybean meal for each one million tons of grain, at the discretion of the USSR, in meeting the minimum purchase commitment. In addition, the agreement permits the USSR to purchase a combined maximum of up to 12 million tons of U.S. wheat and corn without prior consultation with the U.S. government. With consultation, additional purchases beyond the 12 million ton limit are permitted. In recent trade years, the U.S. administration often has increased the maximum quantity in the agreement. For example, in 1984-85 it offered to make as much as 27 million tons of U.S. corn and wheat available to the USSR. However, actual Soviet purchases of U.S. grain were only about two-thirds that amount. In 1985-86 and 1986-87, Soviet purchases remained below the maximum specified in the agreement. The U.S. administration in 1987-88 gave approval to the Soviet Union to buy whatever quantity of U.S. grain it wanted. In 1988-89, the maximum purchase level was raised to 26 million metric tons, despite the most severe U.S. drought in over half a century.

A long-term agreement has been part of the U.S. trade policy with the USSR since the mid-1970s. It was originated in an effort to bring greater stability and predictability to Soviet purchasing patterns. Through most of the period in which the agreements have been in effect both sides have honored their minimum commitments for corn and wheat. However, in 1984-85 and 1985-86, the USSR temporarily failed to meet its minimum annual U.S. wheat purchase obligations. As their explanation for doing so, Soviet officials said U.S. wheat was priced above wheat of other exporters and that the U.S. had refused to grant the USSR adequate price concessions through its Export Payment-in-Kind (or Export Enhancement) program. Since then, large offers of Export Enhancement Program (EEP) wheat have been extended to the Soviet Union and have resulted in large Soviet purchases of U.S. wheat.

Despite the past problems with wheat sales to the Soviets, the USSR is likely to continue as a large importer of U.S. corn in the next few years. Alternative non-U.S. supplies of corn in quantities typically imported by the USSR are more limited than those for wheat. However, total Soviet purchases of U.S. grain probably will continue to vary substantially from year to year, depending on the size of the Soviet grain harvest, the availability of foreign exchange, and political relationships between the two nations.

**Table 16. Soviet Oilseed Production in Millions of Metric Tons, 1972-73 through 1988-89, and Projections for 1989-90.**

| | Soybeans | Cottonseed | Sunflower |
|---|---|---|---|
| Preliminary | | | |
| 1988-89 | .73 | 5.02 | 6.20 |
| 1987-88 | .71 | 4.49 | 6.08 |
| 1986-87 | .70 | 4.87 | 5.26 |
| 1985-86 | .46 | 4.94 | 5.23 |
| 1984-85 | .47 | 4.74 | 4.53 |
| 1983-84 | .56 | 4.82 | 5.06 |
| 1982-83 | .50 | 5.09 | 5.34 |
| 1981-82 | .45 | 5.28 | 4.65 |
| 1980-81 | .53 | 5.08 | 4.62 |
| 1979-80 | .40 | 4.14 | 5.41 |
| 1978-79 | .63 | 4.67 | 5.33 |
| 1977-78 | .54 | 4.69 | 5.90 |
| 1976-77 | .48 | 4.51 | 5.28 |
| 1975-76 | .78 | 4.81 | 4.99 |
| 1974-75 | .36 | 4.53 | 6.78 |
| 1973-74 | .42 | 4.36 | 7.39 |
| 1972-73 | .26 | 4.09 | 5.05 |

Sources: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Oilseed Situation and Market Highlights*, FOP 4-88, April 1988; *Foreign Agriculture Circular: Oilseeds and Products*, FOP 4-84, April 1984; FOP 2-84, February 1984; FOP 11-83, November 1983; FOP 9-83, September 1983; FOP 13-82, November 1982; *Foreign Agriculture Circular: World Crop Production*, WCP 4-85, April 1985; WCP 5-86, May 12, 1986; WCP 7-87, July 1987; WCP 12-87, December 1987; *Foreign Agriculture Circular: World Agricultural Production*, WAP 2-89, February 1989.

# Financial Developments Affecting U.S. and World Agricultural Trade

After the longest peace-time economic expansion in the nation's history, the U.S. economy is expected to experience a gradually slowing rate of growth into the early 1990s. Several private forecasts also show a substantial probability of at least a brief period of recession in the U.S., beginning sometime in 1990 or 1991, due in part to continued large U.S. trade and budget deficits and the unusually long period over which the current expansion has occurred. Because the U.S. led the world economy out of the recession of the early 1980s, slower U.S. economic growth is expected to be a tempering influence on the world economy for the next six to 20 months or more. Growth rates will differ substantially from one country to another. Continued moderate economic growth is expected in Pacific Rim nations including the Republic of Korea, Japan, Taiwan, Hong Kong, Singapore, and Malaysia. Economies of these countries are expected to be supported by strong exports to the U.S. However, economic growth in these countries may be restrained slightly by U.S. trade legislation and U.S. pressure to open their economies to increased U.S. imports. Recent trends also suggest West European economies may experience a relatively slow economic expansion during the next six to 12 months, along with slow economic growth in a number of heavily indebted developing nations. In general, these trends point to a possible slowing in the growth rate of U.S. and world export demand for agricultural products for the next one to two years if weather conditions are favorable in major foreign crop-producing regions.[22]

### Key Problem Areas

Global economic prospects for the years immediately ahead are closely related to three problem areas: (1) continued heavy indebtedness of developing nations, the U.S. government, and many private firms and individuals in developed economies, accompanied by large financial needs for debt servicing; (2) fluctuations in the exchange rate of the U.S. dollar; and (3) the level of real interest rates (nominal interest rate minus inflation rate), which affect debt-servicing costs, economic growth, the availability of consumer funds for food purchases, and agricultural production, processing, storage, and marketing costs.[23] These three problem areas are closely interrelated and stem, at least partly, from U.S. monetary and fiscal policies. The U.S. fiscal policy with several years of record federal budget deficits is highly stimulative to the U.S. economy. To offset this and restrain inflationary pressures, a relatively restrictive U.S. monetary policy is required. These diverging policies have created a strong U.S. government demand for credit, with resulting high domestic real interest rates, even though U.S. real interest rates declined considerably from record levels of the early 1980s.

Since international investment capital moves freely and quickly from one country to another in search of maximum returns, capital movement into the U.S. has been heavy. The strong foreign demand for U.S. dollars for investment purposes has been a supporting influence on the U.S. currency, with its value against major West European and Pacific Rim currencies rising sharply from early 1988 to mid-1989. Foreign capital flows into the United States have assisted in financing the U.S. federal budget deficit. A weaker U.S. dollar would increase the threat of inflationary pressures stemming from imported goods while encouraging increased U.S. exports, and would increase the pressures on U.S. monetary authorities to implement more restrictive monetary policies. That, in turn, would tend to raise global interest rates, slow economic growth in the U.S. and abroad, and could worsen debt-servicing problems of developing nations.

Other countries also adopted more restrictive monetary policies in the 1980s as an effort to retard capital outflows to the U.S. Resulting relatively high non-U.S. real interest rates, along with movement of investment capital to the U.S., have tended to hold foreign economic growth well below the unusually strong levels of the 1970s. These interest rates have pushed inflation rates in most industrial nations well below the levels of the previous decade, although inflationary pressures increased somewhat in many countries in 1988 and 1989.

From time to time in recent years, problems of debt and high real (inflation-adjusted) interest rates have caused uneasiness about the health of the U.S. and world banking systems. This concern comes from heavy involvement of some lending institutions in loans to developing nations experiencing difficulty meeting debt-servicing requirements, and from financial risk-exposure of lending institutions involved in foreign exchange transactions and the stock and bond markets. The global financial system could be placed under severe pressure in case of widespread defaults on developing nation loans or major losses from transactions in volatile financial markets. Occasionally, other concerns about the banking system stem from debt burdens of private U.S. firms, and from investment losses due to interest rate volatility. However, developing nations are making gradual progress in reordering their economies to meet debt-servicing requirements. Their progress and cooperation from international financial institutions have reduced concerns about the stability of the international banking system.

### Adjustments of Developing Nations to Debt Burdens

Brazil, Mexico, and Argentina are the three most heavily indebted developing nations. Eastern Europe and several oil-exporting nations also have substantial debt burdens. In Latin America, debt burden adjustments have generally involved a four-dimensional approach: (1) reducing government spending, (2) restructuring debts to lengthen repayment period, (3) reducing nonessential imports, and (4) taking steps to increase exports. After experiencing severely reduced real economic output in the early 1980s, many Latin American countries have experienced slightly positive real economic growth recently.[24] But exports of countries such as Brazil and Argentina are creating increased competition for U.S. agricultural exports. Heavily indebted nations are under strong pressure to restrain imports and increase exports to meet debt-servicing costs.

Variations in world petroleum prices have a direct impact on the economic growth of Mexico, Venezuela, Nigeria, the Middle East, and other oil-exporting developing nations. Relatively low energy export prices have a negative impact on the debt-servicing ability of these countries while helping to slightly ease debt problems of oil-importing nations. Conversely, rising energy prices increase aggregate demand and debt-servicing ability of oil-exporting nations, and have a negative impact on the debt servicing ability and economics of oil-importing countries.

### Exchange Rate Volatility

Exchange rate volatility can affect prices foreign consumers pay for some U.S. farm products, and thus is an additional factor influencing U.S. agricultural exports. From mid-September 1985 to mid-April 1988 the exchange rate of the U.S. dollar declined by approximately 49 percent in terms of the Japanese yen and by 43 and 36 percent respectively against the West German mark

and French franc. During this period of a declining dollar relative to currencies of most major developed countries, the declines relative to the currencies of Canada, Australia, Korea, and Taiwan were considerably smaller. The dollar actually strengthened relative to currencies of some developing countries. From mid 1988 to mid-1989, the dollar reversed its earlier downward trend and rose in value by one-fifth to one-third against currencies of major developing countries. In recent years, a group of seven industrial nations has attempted to coordinate monetary policy to reduce exchange rate fluctuations with a limited degree of success. The seven include: the U.S., United Kingdom, France, West Germany, Canada, Italy, and Japan. These nations agreed to coordinate monetary and fiscal policies in ways that permit the U.S. dollar to remain well below earlier peak exchange rates relative to currencies of major industrial nations. Coordinated action by the group was triggered partly by strong pressure for trade protectionism in the U.S. Congress to shield U.S. industries from low-cost imported products. The strong dollar from 1981 to early 1985 substantially reduced the cost of many products imported into the U.S. and was a contributor to the large and growing U.S. trade deficit. Rapid fluctuations in exchange rates complicate trading patterns by increasing the risk exposure of trading firms, causing short-term changes in capital flows, increasing the volatility of interest rates, and adding to risk levels involved in capital investment decisions.

Through mid-1989, the quantity of U.S. agricultural exports showed a positive response to the weaker dollar of the 1985-88 period and to several other positive influences. A lower exchange rate of the U.S. dollar tends to reduce the cost of U.S. products to foreign buyers and, theoretically, should encourage increased exports. But grain prices to final users in most of Western Europe, the USSR, and Eastern Europe, and wheat prices in Japan and many other wheat-importing nations are largely insulated from exchange rate fluctuations.[25] Thus, a weaker dollar should not be expected to greatly expand demand for U.S. grain in these areas. Unlike wheat and corn (maize) prices, soybean and soybean meal prices to most foreign users are relatively free of artificial restrictions and reflect exchange rate changes within a relatively short time. Thus, the weaker dollar likely contributed to the increase in U.S. soybean exports from September 1987 to August 1988, despite competition from increased foreign oilseed supplies.

The dollar's continued strength relative to currencies of other grain exporters and many developing nations also limited the response of U.S. grain exports to the 1985-1988 decline in the dollar's exchange rate against West European and Japanese currencies. For example, while the U.S. dollar fell about 49 percent relative to the Japanese yen from mid-September 1985 to mid-April 1988, it declined only 10 percent against the Canadian dollar, 9 percent against the Australian dollar, 16 percent against South Korean currency, 29 percent against the Taiwan dollar, 30 percent against the U.K. pound, and rose relative to currencies of Brazil, Argentina, and Pakistan.[26] Also, a declining dollar reduces the purchasing power of oil-exporting nations because petroleum is priced in U.S. dollars in world markets. In short, the decline in the U.S. dollar's exchange rate was a slightly positive factor in U.S. agricultural trade through mid-1988, with a more positive impact on oilseeds than on grains. Export gains in U.S. food and feed grains appeared to be more related to U.S. government price-support policies that held grain prices at low levels; crop production short-falls in several major foreign producing regions; and an aggressive U.S. government export assistance program for wheat and barley, which sharply lowered the cost of these products to foreign buyers.

Future exchange-rate impacts on U.S. agriculture will depend on whether a sustained and broad-based decline in the value of the U.S. dollar can be achieved and on the availability of competing farm product supplies in world markets. When supplies of foreign exporters are large, these nations are likely to offer their products at whatever prices are needed to meet U.S. competition and move supplies into world markets. Over time, low world prices stemming from U.S. price support, export assistance, and exchange rate policies should encourage expansion of world grain, oilseed, and meat utilization with a resulting increase in agricultural trade. Relatively low world prices for grains and the weaker U.S. dollar also may bring slightly reduced utilization of major inputs such as fertilizer and could encourage an idling of marginal quality land in some areas. Such developments would be restraining influences on global grain production. However, time lags of two to four years may be involved before the full effect of a sustained lower U.S. dollar can be noted in agricultural trade patterns.

# China, India Remain Net Grain Importers

In 1987-88, China and India re-emerged as large importers of grain after being significant exporters in the previous three years. They continued to be net grain importers in 1988-89. The reasons behind these shifts are of special importance to the world grain economy, because the countries are the world's two most heavily populated nations and represent over one-third of the global population. India's shift to a net import position was primarily due to a severe 1987 drought, while China's shift appears to be due to combination of adverse weather, government adjustments in grain prices relative to those for other crops, and rapid internal demand growth stemming from expansion of industrial exports and growing consumer incomes. Since the early 1970s, both countries have occasionally been large importers of U.S. grain, often in response to weather problems. When such shifts to net importing positions occur, the results have reduced foreign competition faced by U.S. grains in Far East markets and additional export opportunities for American grain in these two countries. A key consideration for private and public decision makers is whether this new source of import demand in 1988-89 is temporary, or will continue in future years.

## China

Before its adverse weather in 1987 and 1988, China's grain production had grown at a sharply accelerated rate since the mid-1970s. The growth was due to the combined effects of increased use of technology and changes in its economic system (see Figure 27). Technological developments included construction of a large number of new fertilizer plants, increased use of fertilizer, expanded irrigation, improved varieties, and changes in government policies to encourage research. In the late 1970s, China also changed its economic system, allowing farm workers greater freedom in managing production and providing individual economic incentives to farm workers to market excess production for cash payments.[27] Increased domestic grain production made China a net exporter of corn and, at times, of soybeans during the mid to late 1980s. Its exports compete with U.S. grain and soybeans in Korea, Japan, and the USSR. In 1988-89, China remained a modest net exporter of coarse grains, but its wheat imports increased by an estimated 1.5 million metric tons, boosting its total wheat imports to 16 million metric tons, nearly double the level of two years earlier. Only a small part of the sharp increase in Chinese wheat imports appears to be due to 1987 and 1988 weather problems because wheat production in both years was only an estimated 2.5 million tons below 1986. Growing population and consumer demand appear to have been more significant factors behind the growth of Chinese wheat imports since 1986-87. Reports from China indicate the inability of production to keep pace with growing consumption is partially due to a government decision to lower grain prices relative to those for other crops. Reportedly that has caused a shift of cropland from grain to other products.

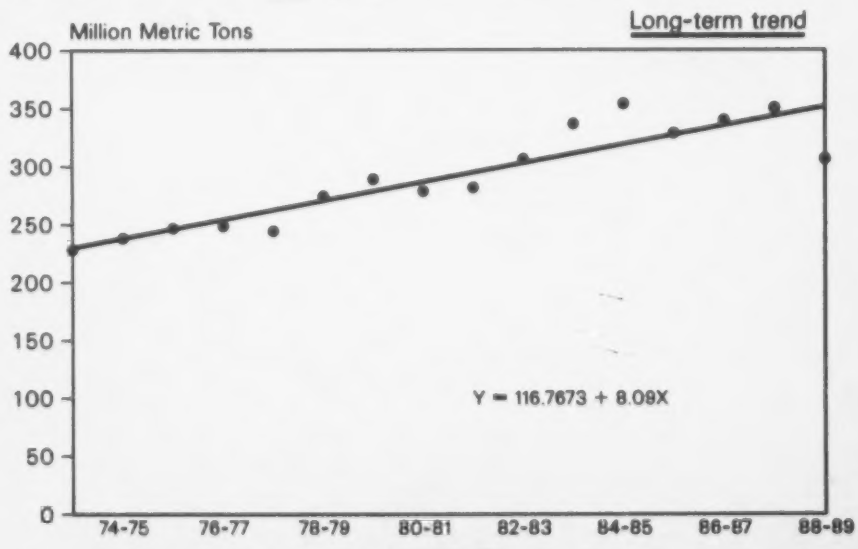
Future trends in Chinese grain and soybean imports will depend heavily on China's political stability, economic growth and grain pricing policies, and its ability to generate further technological improvements in production through expanded agricultural research. Import patterns also will be influenced by trends in urban incomes and food consumption.[28] With political stability and continued access to international capital markets, an upward trend in Chinese per capita income and a likely increase in consumption of meat and poultry will limit the expansion of Chinese coarse grain and oilseed exports and could make the nation a net importer in these crops at times in the next few years, even when its crops are good. In addition, China may be a substantial continuous importer of wheat in the next few years, with its imports increasing sharply in times of adverse weather and reduced yields.

## India

India is the second most populous nation in the world. Its grain production capability is more variable than China's, partly because Indian grain production is heavily dependent on monsoon rains. Below-normal monsoon rains in 1987 sharply reduced India's grain production, causing the nation to halt exports, draw down carryover stocks, and import corn and sorghum in 1987-88 and wheat in both 1987-88 and 1988-89. In addition, its imports of vegetable oils in 1987-88 increased sharply from levels of recent years. From 1983-84 through 1986-87, it was a small exporter of wheat, feed grains, and protein meal while accumulating large carryover stocks of food grains.

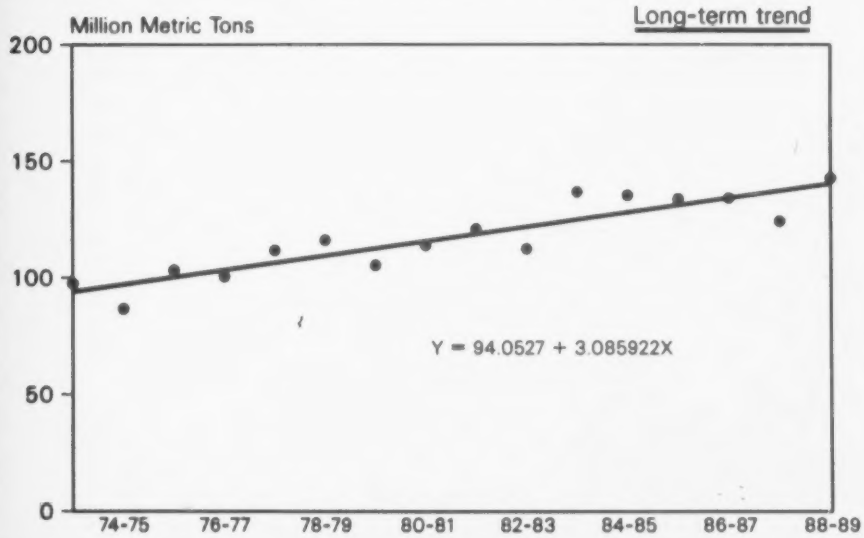
As shown in Figure 28, before the 1987 drought India made recent impressive strides in grain production through the use of improved technology. Grain production increased because of better management, use of higher yielding varieties, and expanded use of fertilizer and irrigation. The

**Figure 27. Trend in Chinese Grain Production, 1973-74 through 1988-89.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Grains*, FG 6-85, April 1985; *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 4-87, April 1987; FG 3-88, March 1988; various other issues; *Foreign Agriculture Circular: World Agriculture Production*, WAP 1-88, January 1988; WAP 4-89, April 1989.

**Figure 28. Trend in Indian Grain Production, 1973-74 through 1988-89.**




Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), 1987; U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Grains*, FG 9-76, May 1976; FG 20-78, November 1978; FG 5-80, February 1980; FG 4-81, January 28, 1981; FG 13-82, April 26, 1982; FG 26-83, September 9, 1983; FG 19-83, November 8, 1983; FG 2-85, January 1985; FG 7-85, May 1985; *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 4-87, April 1987; FG 3-88, March 1988; *Foreign Agriculture Circular: World Crop Production*, WCP 4-87, April 1987; *Foreign Agriculture Circular: World Agricultural Production*, WAP 1-88, January 1988.

1987 drought reduced water supplies in irrigation reservoirs and wells, restraining the nation's grain production in 1988. Unless extended weather problems occur, improved management and technology are likely to push Indian grain production irregularly higher in the next several years. But, with its population of over 700 million people and variable weather patterns, India is likely to alternate from a grain exporting to an importing position from now through the late 1990s.

# U.S. Agricultural Exports Rise in 1988, Imports Steady

U.S. agricultural exports reversed their downward trend of the previous six years in the last half of calendar year 1987 and shifted into an uptrend that continued through 1989. The nation's agricultural exports for calendar year 1988 totaled $37.1 billion and 148.5 million metric tons. U.S. agricultural exports increased 29 percent from the previous year in dollar value due to a substantial rise in grain and oilseed prices and increased 11 percent in volume. The recent upward trend follows several years in which U.S. exports in dollar value reflected declining prices for most major U.S. agricultural products, and sharply reduced U.S. grain export volumes. The volume of U.S. exports was reduced during the first half of the decade by increasing supplies available from competing agricultural exporters, increased self-sufficiency of many importing nations, and slower growth in world consumption of farm products than in the 1970s.

Foreign production and stocks of grain and some oilseeds were reduced in 1987 and continued at lower levels in 1988 and early 1989 due to the severe 1987 drought in India, Pakistan, Thailand, and neighboring countries and a 1988 drought in Canada, parts of Eastern Europe, and the Southern Hemisphere. Crop problems in these areas and growth in the world economy, changing U.S. price support policies, and aggressive U.S. government export assistance programs were important factors behind increased U.S. farm product exports in the last two and one-half years. Tentative projections place total U.S. agricultural exports for the October 1988-September 1989 fiscal year at $39 billion, 10 percent above the previous year's level but 11 percent below the 1980-81 record.[29]

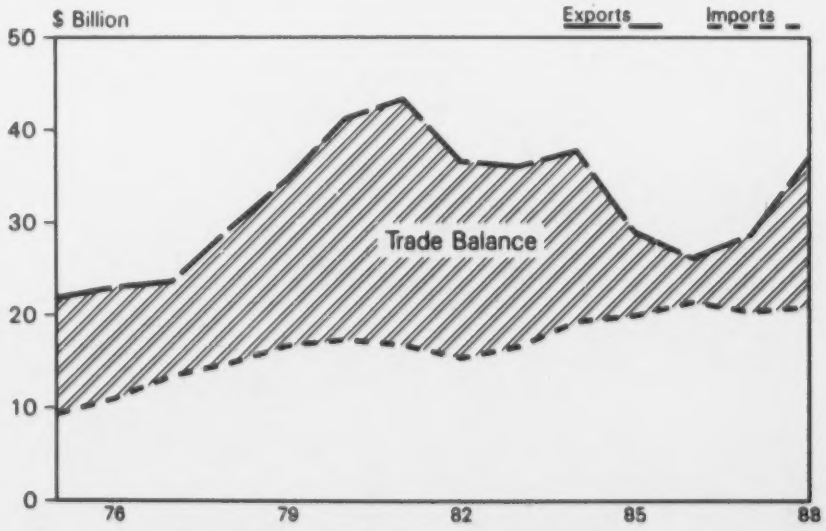
The value of U.S. agricultural imports has been relatively stable since 1985-86. Preliminary indicators point to another year of stable U.S. agricultural imports in 1988-89. The nation's total imports of all agricultural products in fiscal 1987-88 totaled $21 billion, up only 0.7 percent from the record 1985-86 level. With imports valued at $21 billion and exports at $35.3 billion in fiscal 1987-88, the U.S. net trade surplus in farm products increased to $14.3 billion, about double the size of the previous year but only slightly more than half as large as in 1980-81. Despite improvement from a year earlier, the net U.S. agricultural trade balance still was the fourth lowest since the early 1970s. The improved U.S. agricultural trade balance also was accompanied by a modest improvement in the U.S. nonagricultural trade balance.

While the U.S. agricultural trade balance is increasing, there is much room for improvement and it remains a matter of concern to both the agricultural and nonagricultural sectors of the U.S. economy. For the agricultural sector, the trade balance means continued restraint on income and the financial health of production agriculture, and restrained demand for inputs such as farm machinery, seed, fertilizer, chemicals, livestock facilities, and equipment. It also means improving, but still restrained employment in these and other sectors supplying agriculture, and in processing, handling, transporting, and exporting farm products. Restricted income and employment in these areas have a multiplier effect on economic activity in rural communities because farm families limit expenditures for farm and nonfarm items, resulting in restrained agriculturally related employment and economic activity in main street businesses of rural communities.

At the national level, the net trade surplus in agriculture in past years helped pay for a substantial part of the nation's imports of nonfarm products. As a result, it contributed to the economic well-being of the U.S. population and helped to stabilize the exchange rate of the U.S. dollar so the cost of imported items remained reasonable. But the U.S. nonagricultural trade deficit has been so large in the last several years that the modest trade surplus in agriculture now offsets only about 10 percent of the total trade deficit.

Major imbalances in U.S. monetary and fiscal policies are partly responsible for the huge deficit in the nonagricultural sector. Fiscal policies reflect major federal budget deficits, and the need for those deficits to be financed partly through foreign investments in the U.S. That has created a strong demand for U.S. dollars abroad to be recycled back into the U.S. for investment purposes. And with a somewhat restrictive U.S. monetary policy, the financial market and exchange rate mechanisms supplied those dollars to foreign investors through large U.S. imports. Nonagricultural U.S. exports in fiscal 1988 totaled $259 billion, up 28 percent from the previous year. At the same time, nonagricultural imports rose to $409 billion, an 11 percent increase from fiscal 1987. The resulting deficit in nonagricultural U.S. foreign trade of $150 billion far outweighed the $14.3 billion agricultural trade surplus. For comparison, the U.S. nonagricultural trade deficit in fiscal 1980-81 was $52.0 billion, and the U.S. agricultural trade surplus was $26.6 billion.

**Figure 29. Dollar Value of U.S. Agricultural Exports and Imports, 1975-88 Calendar Years.**



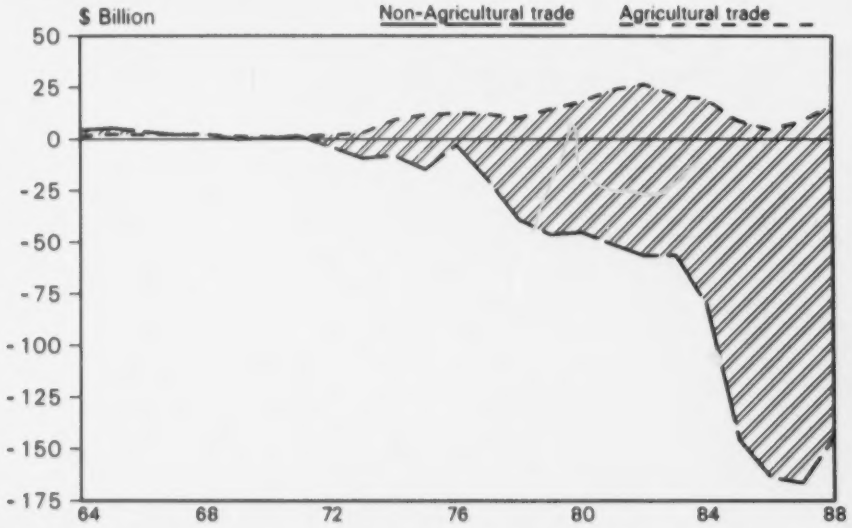

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, January-February 1988; January-February 1989; various other issues.

If not substantially reduced soon, the large U.S. trade deficit will have important implications for U.S. economic growth and interest rates, and for the economic health of U.S. agriculture and other sectors heavily dependent on exports and/or sensitive to import competition. Policy tools for dealing with this problem will be discussed in a later section of this report. Preliminary indications point to a continued large, but modestly declining U.S. trade deficit in fiscal 1989, with a slight to modest decline in the value of U.S. agricultural exports possible.

The sharp decline in U.S. agricultural exports in the first half of this decade was one of several factors behind severe economic pressures in U.S. agriculture and a sharp decline in asset values in the U.S. agricultural sector in the mid-1980s. Over the next several years, with near-normal weather in major foreign grain-producing areas, new U.S. farm policies are likely to generate additional expansion of the nation's farm product exports. However, growth of U.S. agricultural exports is likely to remain well below the sharp upward trend of the 1970s and fiscal 1987-88 when foreign weather problems brought accelerated U.S. exports. Several more years of economic adjustment appear necessary before Eastern Europe, Latin America, and other developing nations fully recover from current debt problems. Oil-exporting nations also are experiencing some of these same economic adjustments, with reduced availability of funds for farm product imports and possible slower economic growth in the years ahead. Growth rates for U.S. agricultural exports also will depend on future trends in the value of the U.S. dollar.

Although the growth rate may slow, recent major changes in U.S. policies, including sharply lower price support levels for major crops, should continue to encourage modest long-term growth in the volume of U.S. agricultural exports in the 1990s.

**Figure 30. Net U.S. Trade Balance in Agricultural and Nonagricultural Products by Calendar Years, 1964-88.**




Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, January-February 1988; January-February 1989; various other issues.

# U.S. Government-Assisted Export Programs: Export Enhancement Program (EEP) Remains Large

In contrast to the 1970s when U.S. government agricultural export assistance programs were small, official programs to encourage expanded agricultural exports increased greatly in size in the last few years to combat declining U.S. shares of global agricultural exports. For example, about two-thirds of the 1988-89 U.S. wheat exports were made under the Export Enhancement Program (EEP). U.S. export assistance programs trace their origins to the 1920s and to the Agricultural Development and Assistance Act of 1954 (Public Law 480). Originally they were intended to: (1) assist in disposal of surplus U.S. agricultural commodities, (2) help countries lacking foreign exchange purchase U.S. agricultural products, and (3) facilitate U.S. foreign aid efforts.[30] In the last 15 years, similar programs have been developed by Western Europe and Japan. And since the mid-1980s, emphasis in U.S. programs has increasingly shifted toward: (1) meeting price competition from heavily subsidized products of other nations, (2) assisting nations that are unable to obtain commercial financing, (3) providing more attractive financing arrangements than are commercially available in order to compete with financing terms and/or price advantages offered by other exporting nations, and (4) reducing world hunger.

### Concessional Export Assistance Programs

The U.S. has three main types of concessional export programs for agricultural products: Title I and Title II of PL-480 and Agency for International Development (AID) programs. The PL-480 Title I program provides long-term, low-interest U.S. government credit with repayment terms of up to 40 years and a grace period of up to 10 years. Repayments are to be made in U.S. dollars or other currencies readily convertible into dollars. U.S. statutes require three-fourths of food aid exports under Title I to be sent to countries with a per capita gross national product (GNP) of $730 or less per year.[31] Prior to fiscal year 1981-1982, the GNP requirement had been $680 per year. Title II of the PL-480 program involves food donations for export, with about two-thirds of those donations normally shipped by voluntary relief agencies. In past years, India was a major recipient of Title II agricultural exports. That nation accounted for slightly over one-fifth of such shipments in fiscal year 1981-82.[32] With India's increased self-sufficiency in grain and oilseeds, PL-480 shipments to that nation declined from 1982 to 1987. But they increased in 1988 in response to the country's severe 1987 drought. The AID program was initiated in 1979 to provide financial grants and loans for agricultural commodity purchases. After the program's inception, assistance was first directed primarily toward Israel and later extended to Egypt and Sudan.[33] These programs have been oriented heavily toward soybean oil, wheat, flour, and nonfat dry milk.

### Non-Concessional Export Assistance Program[34]

In recent years, the U.S. administration and Congress emphasized U.S. government loan guarantees and other nonconcessional export assistance programs in an effort to halt the downtrend of U.S. agricultural exports. By the 1983-84 fiscal year, about one-eighth of the total dollar value of U.S. agricultural exports was shipped under nonconcessional export assistance and PL-480 programs. In the last three fiscal years, more than four-fifths of U.S. wheat exports moved under some type of government export assistance program.

The two main types of nonconcessional U.S. export assistance programs are EEP and Commodity Credit Corporation (CCC) loan guarantees. The EEP is an export payment-in-kind program in which commercial exporting firms use government certificates to acquire CCC (government owned) commodity inventories. Government commodities then are added to commercially purchased commodities. As a result the net price to the foreign buyer is below the price for nonexport-assisted U.S. products. The EEP has been used extensively for wheat to meet heavily subsidized exports from the EC. It also has been used to a smaller extent for barley, sorghum, butter, and vegetable oils. Major targets of the EEP have been USSR, North Africa, the Middle East, Eastern Europe, and China. Congress developed and mandated the program in the Food Security Act of 1985. Program regulations permit EEP bonus payments in commodities other than the one being sold commercially, if CCC inventories of purchased commodity are low.

CCC loan guarantees (GSM 101 and 102 funds) also are an important part of the nonconcessional export assistance programs. These funds are used to assist exporting firms in making sales to foreign buyers who have difficulty obtaining commercial credit. With CCC loan guarantees, private lending institutions provide short- or intermediate-term credit for purchases of U.S. farm products. The CCC, a U.S. government agency, guarantees repayment of the loans and a sizable part of the interest. U.S. Department of Agriculture officials indicate the repayment history on CCC guaranteed loans generally has been good. Poland is one exception. CCC made some payments on loans to that nation in the past few years because of its severe financial problems. Major destinations under the CCC credit guarantee programs have been Latin America, the Middle East, South Korea, and Eastern Europe, in that order. Wheat, feed grains, and oilseed products have been the major commodities involved.

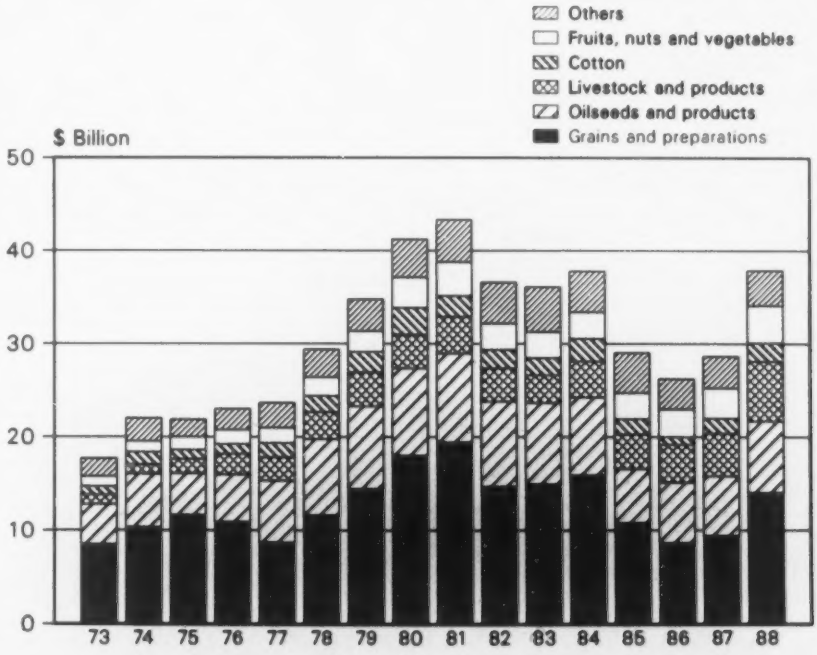
### Cargo Preference Change and Concessional Export Programs

In the Food Security Act of 1985, the U.S. Congress modified the nation's cargo preference provisions by increasing the required percentage of commodities to be shipped under concessional export programs (those under PL-480 and AID programs) in U.S. flag ships to 75 percent. The percentage U.S. flag ship requirement is known as cargo preference. Before this change, the cargo preference requirement was 50 percent. The increase was spread over a three-year period, with a 10 percent increase in 1986 and 1987 and a 5 percent increase in 1988. Shipments of grain under the EEP were specifically excluded from the cargo preference requirements.[35] These changes and a Congressional requirement that the U.S. government use at least $1 billion in government-owned commodities for EEP from 1986 to 1988 led to a sharp increase in government export assistance for several U.S. agricultural commodities, especially wheat, barley, and sorghum.[36] Cargo preference legislation was passed to help the U.S. maintain a viable merchant marine fleet for national defense purposes. In recent years, freight rates of U.S. vessels were as much as $.40 to $.80 per bushel above comparable rates for foreign vessels. The exact differential depends on vessel size, shipping route, destination, and other variables.

# U.S. Agricultural Trade Trends by Commodity Groups

As shown in Figure 31 and Table 17, the dollar value of U.S. agricultural exports rose substantially in the 1987-88 fiscal year. Total agricultural exports were valued at $35.3 billion, 27 percent above the previous year's exports, but still moderately below the 1980-81 record. Increases in value were especially pronounced in 1987-88 in grains, oilseeds, animal products, poultry, fruits, and cotton. Grain export volumes and values increased because of higher prices, reduced foreign supplies and increased import demand in several countries. The quantity of U.S. feed grain exports in 1987-88 increased 12 percent after a sharp increase the previous fiscal year. Total values of the nation's feed grain exports rose by 39 percent. U.S. wheat and wheat product exports increased 41 percent in volume and 50 percent in value. U.S. cotton exports were up 51 percent in value and up 6 percent in volume after large increases the previous year. Exports of oilseeds and oilseed products increased only slightly in value for the year.

**Figure 31. Value of U.S. Agricultural Exports by Commodity, 1973-88 Calendar Years.**




Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, January-February 1988; January-February 1989; various other issues. Livestock excluding poultry and dairy products.

### Composition of U.S. Agricultural Exports

Grain and oilseed exports, as indicated in Figure 31, accounted for a large part of the growth in value of U.S. agricultural exports from 1972 through 1981. These same products also accounted for much of the drop in value of exports from 1981 to 1986, declining by 55 percent in value during that period. Livestock, dairy, and poultry exports now make up about 19 percent of all U.S. agricultural exports in dollar value. The value of these exports as a group in 1987-88 was 47 percent larger than seven years earlier, while cotton exports were about 4 percent larger in value than seven years earlier. The value of fruit and vegetable exports dropped moderately in the mid-1980s but in 1987-88 was 10 percent larger than seven years ago because of a recovery in the past year. Grains, feeds, oilseeds, and oilseed products accounted for approximately two-thirds of the value of U.S. agricultural exports in recent years, but their share dropped to about 57 percent in 1987-88. Exports of grains are increasing in volume and value again in fiscal 1988-89 in response to changing U.S. government programs and weather-reduced crops in some foreign producing areas. The value of U.S. grains, feeds, oilseeds, and oilseed products in 1987-88 was 32 percent lower than seven years earlier. Thus, the composi-

**Table 17. Value of U.S. Agricultural Exports by Type of Commodity, 1976-77, 1980-81, 1985-86, and 1987-88 in Billions of Dollars.**

| Commodity Group | October-September Fiscal Years | | | | Percentage of 1987-88 Total Exports |
|---|---|---|---|---|---|
| | 1976-77 | 1980-81 | 1985-86 | 1987-88 | |
| Feed grains | 5.39 | 10.40 | 3.75 | 5.13 | 14.52 |
| Oilseeds | 4.64 | 6.98 | 4.39 | 5.23 | 14.80 |
| Oilseed meal | 0.97 | 1.67 | 1.13 | 1.50 | 4.25 |
| Vegetable oils | 0.77 | 1.10 | 0.75 | 0.96 | 2.72 |
| Wheat and wheat products | 3.05 | 8.05 | 3.55 | 4.67 | 13.22 |
| Rice | 0.69 | 1.54 | 0.65 | 0.73 | 2.07 |
| Meat and meat products | 0.61 | 0.99 | 1.01 | 1.80 | 5.09 |
| Hides and skins | 0.80 | 1.00 | 1.44 | 1.84 | 5.21 |
| Dairy products | 0.17 | 0.24 | 0.43 | 0.54 | 1.53 |
| Poultry and poultry products | 0.30 | 0.77 | 0.46 | 0.64 | 1.81 |
| Other animals and animal products | 0.77 | 1.11 | 1.01 | 1.24 | 3.51 |
| Cotton | 1.54 | 2.23 | 0.68 | 2.14 | 6.06 |
| Fruits, vegetables, and nuts | 2.45 | 3.56 | 2.91 | 3.90 | 11.04 |
| Tobacco | 1.08 | 1.34 | 1.32 | 1.30 | 3.68 |
| Others | 0.78 | 1.63 | 2.82 | 3.75 | 10.61 |
| Total | 24.01 | 42.61 | 26.30 | 35.33 | 100.11 |

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1988; November-December 1987; November-December 1982; and November 1977.

tion of U.S. exports in recent years has shifted toward value-added products and products with relatively high per unit value.

### U.S. Agricultural Imports

In previous editions of this report, it has been noted that sustained trading relationships require a two-way exchange between trading partners. The United States must be willing to import from countries that purchase U.S. products and services in order to maintain a lasting trading relationship. Products Americans buy from other countries generate earnings those countries can use to purchase U.S. exports. In this process, trading partners usually export products that can be produced more efficiently at home. These same trading partners also tend to import products that can be produced more economically by their trading partners. Through this process, participants on both sides of the transaction can increase their standards of living and can carry on a substantial trading relationship over an extended period of time.[37] Because of this principle of comparative advantage, the U.S. imports a sizable volume of certain agricultural commodities.

Table 18 shows the composition of the value of U.S. agricultural imports in 1987-88 and comparisons with recent years. Nearly one-third of the value of all U.S. agricultural imports is represented by products not produced commercially in the United States or produced only in very limited quantities because of climatic limitations. These products are classified as complementary imports because they do not compete directly with domestic production. Coffee, tea, rubber, cocoa, drugs, spices, bananas, and other tropical fruits are included in this category. The largest single commodity in dollar value in this group, coffee, accounted for 40 percent of the value of all complementary imports in fiscal 1987-88. Value of total U.S. imports of complementary agricultural products in fiscal 1987-88 increased by 2 percent from the previous year. Lower prices for coffee were more than offset by higher prices for other products. Value of supplementary agricultural product imports increased by 5 percent in the 1987-88 fiscal year, with increases in the value of beef, dairy products, vegetables, and fruit imports and decreases in the value of imports of pork, tobacco, and sugar.

Supplementary imports are products that compete with domestic production. As shown in Table 18, the three largest supplementary import groups are: (1) meat and meat products, (2) alcoholic beverages, and (3) fruits, nuts, vegetables, and associated products. Despite a restrictive U.S. sugar import policy and sharply declining sugar imports, U.S. sugar and sugar product imports are still a sizable supplementary import group. Meat and meat product imports in 1987-88 accounted for about 13 percent of the value of all U.S. agricultural imports. Alcoholic beverages and tobacco imports accounted for approximately 15 percent of the total, while fruits, nuts, vegetables, and preparations accounted for 18 percent. While the United States is a large net exporter of oilseeds, oilseed products, grains, and feeds, it also imports small quantities of these products. With the exception of palm oil and coconut oil, these imports usually originate in Canada and represent marketings from elevators, processors, and farmers located near the U.S. border. Likewise, modest quantities of U.S. products sometimes flow across the U.S. border into Canada. The strong U.S. dollar relative to the Canadian dollar in recent years has discouraged this and encouraged increased U.S. imports of Canadian products. U.S. imports of palm oil originate largely in Malaysia, with the volume varying depending on the price advantage relative to soybean oil. U.S. coconut oil imports typically come from the Philippines.

**Table 18. Value of U.S. Agricultural Imports in 1975-76, 1984-85, 1985-86, and 1987-88 October-September Fiscal Years by Commodity Groups in Billions of Dollars.**

| Product | 1975-76 | 1984-85 | 1985-86 | 1987-88 | Percent Change 1975-76 to 1987-88 |
|---|---|---|---|---|---|
| Complementary Imports: | | | | | |
| Cocoa and chocolate | 0.60 | 1.29 | 1.19 | 1.16 | +93 |
| Coffee | 2.39 | 3.24 | 4.40 | 2.60 | +9 |
| Rubber | 0.47 | 0.68 | 0.61 | 0.95 | +102 |
| Tea | 0.09 | 0.18 | 0.14 | 0.12 | +33 |
| Bananas and plantains | 0.26 | 0.75 | 0.74 | 0.82 | +215 |
| Drugs | 0.11 | 0.20 | 0.18 | 0.22 | +100 |
| Others | 0.28 | 0.43 | 0.54 | 0.60 | +114 |
| **Total complementary imports** | 4.21 | 6.78 | 7.80 | 6.47 | +54 |
| Supplementary Imports: | | | | | |
| Dairy products | 0.26 | 0.76 | 0.79 | 0.88 | +238 |
| Hides and skins | 0.20 | 0.24 | 0.20 | 0.25 | +25 |
| Meat and meat products, excluding poultry | 1.44 | 2.21 | 2.25 | 2.80 | +94 |
| Poultry and poultry products, excluding eggs | 0.09 | 0.08 | 0.09 | 0.10 | +11 |
| Other animal products and animals | 0.33 | 0.86 | 0.96 | 1.20 | +264 |
| **Total animals and animal products** | 2.31 | 4.15 | 4.28 | 5.23 | +126 |
| Fruits, nuts, vegetables, and products | 0.88 | 2.49 | 2.80 | 2.94 | +234 |
| Sugar and products | 1.35 | 1.28 | 1.00 | 0.62 | −54 |
| Alcoholic beverages | 0.43 | 1.55 | 1.78 | 2.01 | +364 |
| Oilseeds and products | 0.54 | 0.78 | 0.64 | 0.84 | +56 |
| Grains, grain products, and feed | 0.23 | 0.60 | 0.67 | 0.87 | +278 |
| Tobacco | 0.28 | 0.56 | 0.61 | 0.61 | +118 |
| Others | 0.30 | 1.55 | 1.30 | 1.41 | +370 |
| **Total supplementary imports** | 6.31 | 12.96 | 13.07 | 14.53 | +130 |
| **Total agricultural imports*** | 10.51 | 19.74 | 20.88 | 21.01 | +100 |

Sources: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1988; November-December 1987; November-December 1986; November-December 1985; and November 1977.
*Totals may not add due to rounding.

Figure 32 shows the trend in U.S. imports of agricultural products by major commodity groups since the mid-1970s. The value of sugar imports has dropped sharply since the early 1980s because of lower sugar prices and technological developments in corn processing that brought sharply increased use of high fructose corn sweeteners in U.S. soft drinks and processed foods as a substitute for sugar. U.S. exports of livestock products and imports of red meat are shown in Figures 33 and 34.

### U.S. Agricultural Exports by Leading States and by Economic Groupings of Destinations

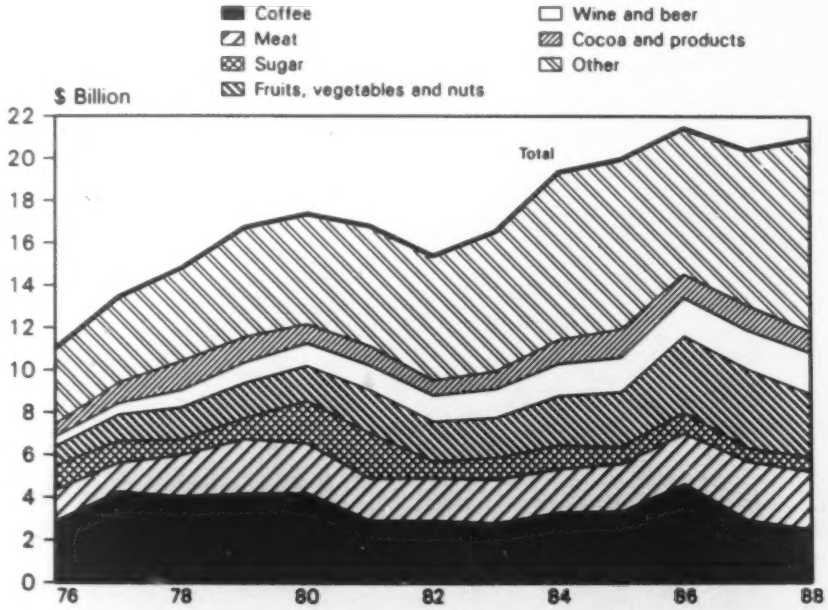
The value of U.S. farm product exports by the leading states for the past three fiscal years is shown in Figure 35. The top four exporting states are California, Iowa, Illinois, and Texas, in that order, with other top-ranking exporting states located in major grain-producing areas of the Midwest. Illinois and Iowa are large exporters of coarse grains, soybeans, soybean products, and livestock. Exports from California and Texas reflect greater diversity and including fruits, vegetables, cotton, and nuts, along with grain and livestock products. The relative ranking of the top 10 agricultural exporting states has changed little in the past six years, but occasionally shifts slightly from year to year depending on the size of crops in individual states.

Figures 36 through 38 show total U.S. agricultural exports, and wheat and corn exports by geographic destinations now and in the mid-1970s. Western Europe has declined sharply for these products since the late 1970s and has become a major competitor. Japan and less-developed countries have grown in importance as a market for U.S. corn. For combined exports of all U.S. farm products, major growth areas since the early 1970s include Latin America, Southeast and East Asia, and Japan. Moderate growth occurred in U.S. exports to north Africa. U.S. agricultural exports to Eastern Europe declined moderately in the last decade due to negative impacts from debt burdens.

### Trends in U.S. Corn and Coarse Grain Exports by Destination

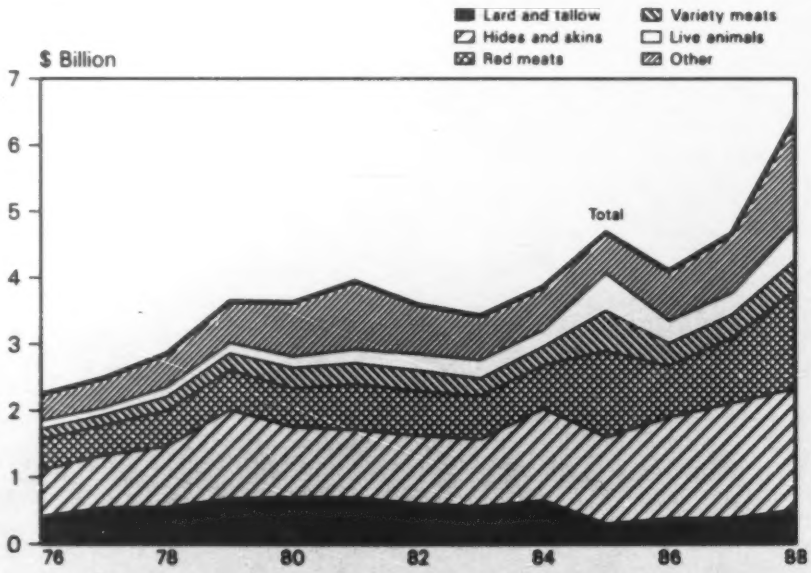
Figures 39 and 40 show a dramatic change in the level and destination of U.S. corn and coarse grain exports since the late 1970s. During most of the two previous decades, the industrial economies of Western Europe and Japan represented the largest foreign outlets for these U.S. grains. Since 1979-80, however, the size of the once large EC

**Figure 32. Value of U.S. Agricultural Imports by Commodity, 1976-88 Calendar Years.**




Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, January-February 1988; January-February 1989; various other issues. Note: "fruits, vegetables, and nuts" category includes bananas. "Other" category includes dairy products, oilseeds and products, rubber, and other imports.

**Figure 33. Value of U.S. Livestock Product Exports by Type of Product, 1976-88 Calendar Years.**



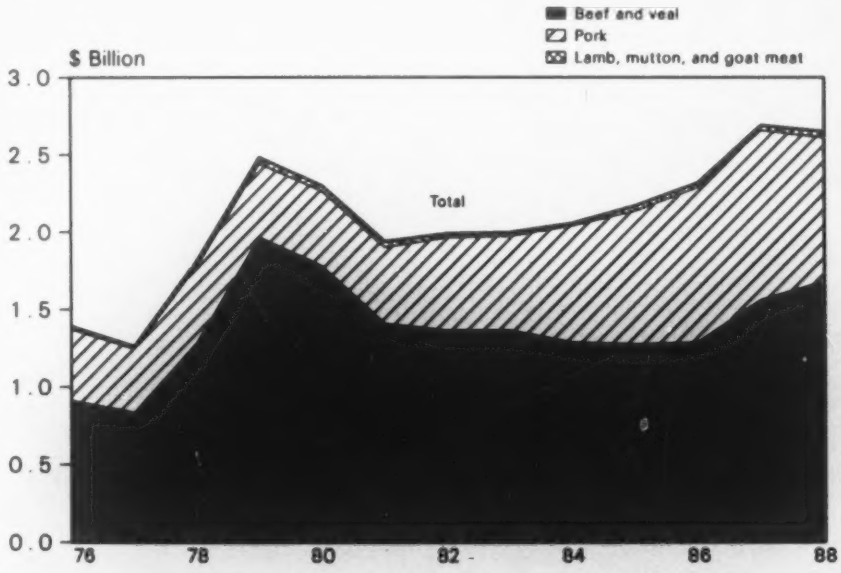

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, January-February 1988; January-February 1989; various other issues. Poultry exports are included in the "other" category.

market for U.S. corn dropped sharply along with a modest decline in exports to other West European nations. The traditionally stable Japanese and Republic of Korea markets also have declined slightly in size as other competitors have taken steps to export to these nations. China, after being a market outlet for U.S. corn from 1975-76 through 1982-83, stopped purchasing U.S. corn beginning in 1983-84 and has become a net corn exporter. Although China imported small amounts of U.S. corn at times in the last three years, it continues to export some corn and is expected to remain a net corn exporter for the 1988-89 marketing year. Chinese exports were an important factor behind declining U.S. corn and coarse grain exports to the Republic of Korea and Japan in the early to mid-1980s. But diminished Chinese competition helped to increase U.S. corn exports to these nations in 1987-88 and 1988-89.

Partially offsetting these trends has been an increased importance of Latin America as a market for U.S. corn along with modest growth in exports to Eastern Europe. The most dramatic change in U.S. corn and coarse grain exports, however, was the extremely sharp decrease in USSR purchases in 1985-86, small purchases in the following two years and a sharp increase in 1988-89. Imports of U.S. corn by the Soviet Union in the 1986-87 and 1987-88 marketing years were less than half the record 1984-85 level. The Soviet Union accounted for about one-third of all U.S. corn exports in the 1984-85 marketing year and one-sixth in the next three years. The sudden surge in Soviet purchases of U.S. corn in 1984-85 reflected that nation's serious 1984 crop problems due to widespread drought and record livestock inventories early in the season. The sharp increase in its imports of U.S. corn in 1988-89 reflected repeat of production problems in its 1988 coarse grain crop and sharply reduced availability of corn from Argentina, normally its second-ranking source of supply for corn. The April-May 1989 Argentine corn harvest was far below normal because of severe drought.

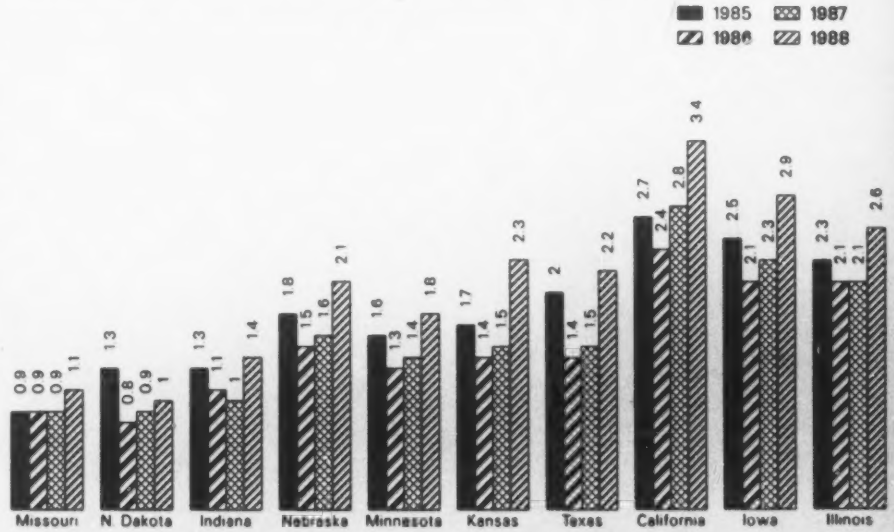
Preliminary indications show potential for slightly decreased total U.S. corn and coarse grain exports in 1989-90, although the exact level of shipments will be influenced by the size of foreign crops and especially by the outcome of the 1989 USSR grain and forage harvests. Several developments, including changing U.S. farm programs and slower growth of foreign

**Figure 34. Value of U.S. Red Meat Imports by Type of Product, 1976-88 Calendar Years.**




Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, January-February 1988; Jaunary-February 1989; various other issues.

**Figure 35. Value of U.S. Agricultural Exports by Selected States in Billions of Dollars, Fiscal Years 1984-85 through 1987-88.**




Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, March-April 1988; March-April 1989; various other issues; and personal communications with officials of U.S. Department of Agriculture, Economic Research Service.

grain production appear to be setting the stage for modest growth in U.S. corn and coarse grain exports in the next few years. But global debt problems and slower world economic growth are likely to hold export growth rates during this period well below those of the 1970s.

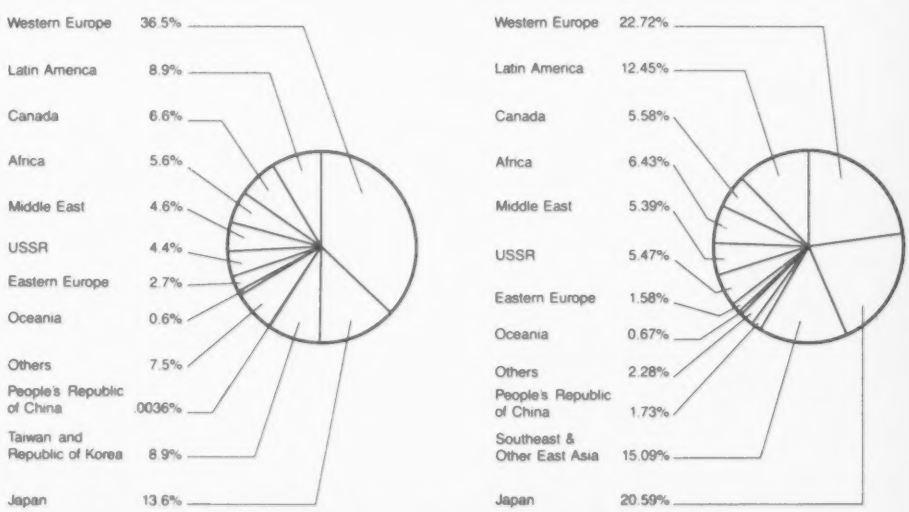
### Trends in U.S. Soybean and Soybean Product Exports by Destination

For nearly three decades, the industrial economies of Western Europe and Japan have been the major foreign outlets for U.S. soybeans and soybean meal, with soybean meal being an important input for livestock and poultry production (see Figures 41 and 42). U.S. soybean oil exports, on the other hand, are shipped primarily to developing nations where they are used for human consumption as cooking oils (see Figure 43). Until 1982-83, U.S. soybean and soybean meal exports exhibited a strong and relatively stable upward trend driven by growing consumer demand for livestock and poultry products and limited growth of competing protein meals.

Growth in foreign demand for U.S. soybeans and meal during the past two decades was greatest in the European Community, which, until recently, accounted for approximately two-thirds of all U.S. soybean meal exports and approximately half of U.S. soybean exports. Growth in the EC market during the 1970s was encouraged by rising consumer incomes, high domestic EC support prices for grain, a weak U.S. dollar, and an absence of EC import restrictions on soybeans and soybean meal. The EC's Common Agricultural Policy (CAP) maintained internal grain prices well above world levels. A complex price support mechanism automatically adjusted EC grain prices for changes in the exchange rate of the U.S. dollar as it affected grain import costs. In contrast, soybean and meal imports enter the EC at world price levels, with a weak U.S. dollar enhancing soybean meal's attractiveness as a feed ingredient. The combination of EC support prices for coarse grains sharply above the world levels and EC soybean meal priced at world levels created a soybean meal/corn price ratio in the EC much more favorable for soybean meal feeding than in the U.S. and most other nations. As a result, soybean meal in the EC was fed both as a protein source and as an energy source or grain substitute.[18] In years when world grain and soybean prices rise sharply, the relatively steady EC internal grain prices and rising soybean meal prices tend to reduce EC soybean and soybean meal imports and soybean meal feeding substantially, as in 1983-84.

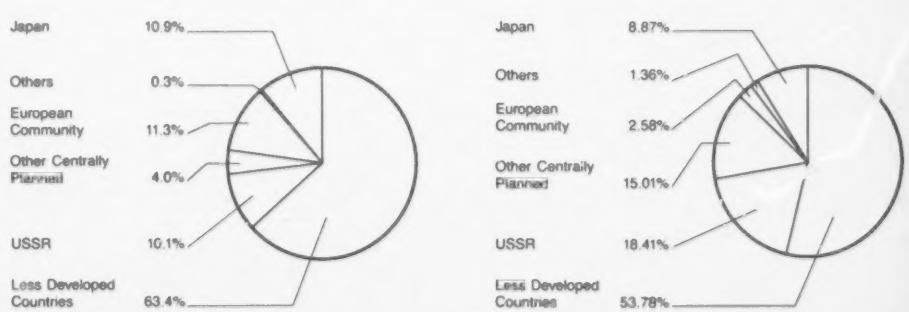
Other contributing factors behind the sharply lower EC purchases of U.S. soybeans and meal in recent years include: (1) a sluggish general economy with slower

**Figure 36. U.S. Agricultural Export Percentage Shares in Value to Selected Destinations, 1976-77 and 1987-88 Fiscal Years.**




Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987; November-December 1988, and Fiscal Year 1987 Supplement; and personal communications with officials of U.S. Department of Agriculture, Economic Research Service.

**Figure 37. U.S. Wheat Export Percentage Shares to Selected Destinations, October-September 1975-76 and 1987-88.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Grains*, FG 37-82, December 8, 1982; Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987; November-December 1988. Less developed countries include rapidly and moderately developing nations (excluding Greece) and other developing nations.

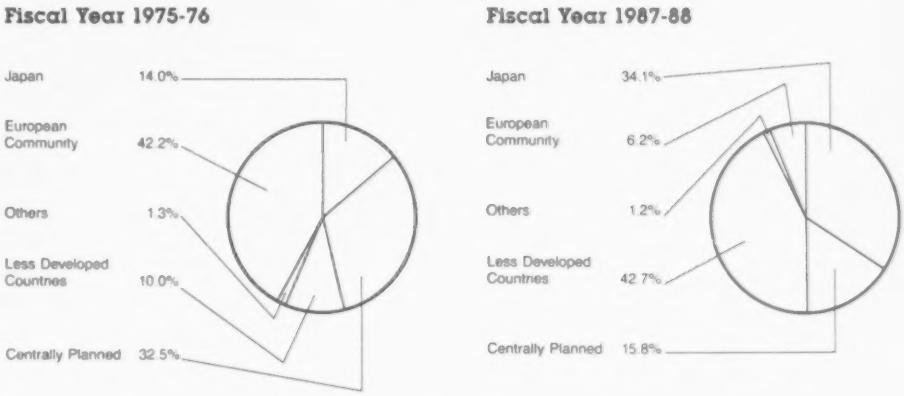
growth in EC incomes than in the 1970s and high unemployment, (2) a dairy surplus reduction program that sharply reduced manufacturing dairy feed sales beginning in 1984-85,[39] (3) sharply expanded EC wheat feeding, and (4) large imports of U.S. corn gluten feed and meal as a substitute for soybean meal. Wheat has a higher protein content than corn, which it replaced in livestock and poultry rations, thus reducing soybean meal requirements. Corn gluten feed and meal are by-products of the U.S. corn sweeteners and alcohol fuels industry, with around 3.5 million metric tons of these products exported annually to EC in the last five years.[40] U.S. soybean meal exports to EC in 1987-88 totaled 1.5 million metric tons, down sharply from about 3.9 million tons in 1979-80.

An upward trend in U.S. soybean and soybean meal exports since 1985-86 reflected slightly accelerated economic growth in a number of foreign countries. Additional factors include an improvement in economic conditions in the West European livestock sector and increased soybean and soybean meal imports by the USSR.

U.S. soybean and soybean meal exports in the years ahead will depend on the exchange rate of the U.S. dollar, EC domestic oilseed, livestock and dairy policies, and world economic growth. The strengthening dollar in the early 1980s created a price shock in EC meal markets similar to that from a short U.S. crop. Recent strength of the U.S. dollar, after a decline in the mid-1980s, may temper future growth in U.S. bean and meal exports,[41] but may be offset by growth in exports to Eastern Europe and the USSR as those nations seek to improve efficiency of their livestock sectors. But growth rates are likely to remain well below those of the 1970s because of slower growth in the world economy, continued restraints from debt problems in developing nations including Eastern Europe, and increased foreign oilseed production.

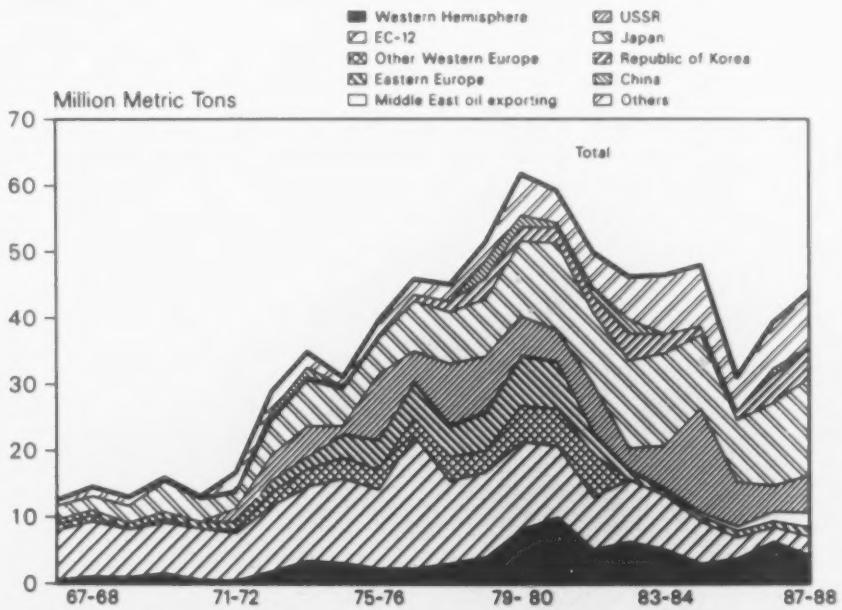
In contrast to U.S. soybean meal and soybean exports, major foreign markets for soybean oil are primarily developing nations in Asia, Africa, and Latin America. As Figure 43 indicates, U.S. soybean oil exports were highly variable from year to year for more than two decades. Short-term fluctuations in exports are due largely to changes in production of major competing foreign vegetable oils, animal fats, marine

**Figure 38. U.S. Corn Export Percentage Shares to Selected Destinations, October-September 1975-76 and 1987-88.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Grains*, FG 37-82, December 1982; Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987; November-December 1988. Less developed countries include rapidly and moderately developing nations (excluding Greece, Spain, and Portugal) and other developing nations.

**Figure 39. U.S. Corn Exports by Destination, October-September 1966-67 through 1987-88.***




Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; *Grain Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987; November-December 1988.
*From 1982-83 on, the EC is EC-12.

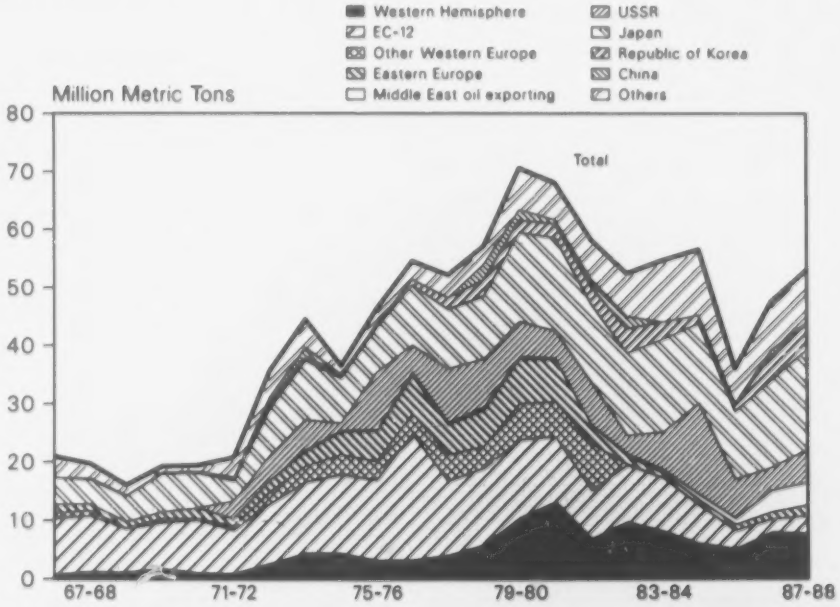
oils, and changes in U.S. soybean oil supplies and prices. Export demand for U.S. soybean oil is highly price inelastic. In other words, large changes in prices are needed to bring significant increases or decreases in exports, provided all other market influences remain unchanged. For example, U.S. soybean oil exports dropped sharply in 1983-84, not because of reduced demand, but primarily due to drought reduced U.S. soybean supplies, limited availability of U.S. soybean oil for export, a sharp rise in soybean oil prices, and the rationing effect on exports resulting from the higher prices. To bring about the required sharp decline in U.S. exports, soybean oil prices in late 1983 and early 1984 rose more than 50 percent above the average level of previous years. The strong dollar and debt burdens of developing nations also tended to reduce 1983-84 soybean oil exports. But with a high percentage of U.S. soybean oil exports shipped under government financing programs, these factors tend to be slightly less significant than in grain and soybean exports.

U.S. soybean oil exports in the 1987-88 fiscal year were well above the previous season's severely depressed level but well below the peak level of 1979-80. Exports to India remained sharply below previous peak levels despite its drought-reduced 1987 oilseed crops. U.S. soybean oil sales to India were restrained partially by strong competition from Malaysian palm oil. U.S. soybean oil exports to Pakistan and Africa and most other destinations in 1987-88 also increased from a year earlier. World palm oil production has been moderately variable from year to year, depending on weather conditions in major producing areas. The long-term upward trend in Malaysian production was temporarily interrupted in late 1986 and early 1987, before turning upward later in 1987 and 1988.

An abrupt change in the global soybean oil situation occurred in 1985-86 with the new trend continuing into mid-1988-89. With substantially increased U.S. soybean and Malaysian palm oil production, global soybean and vegetable oil stocks rose sharply and were still at relatively high levels in mid-1989. Rising stocks pushed soybean oil prices sharply below average levels of the previous six years. Early indications are that world palm oil and soybean oil supplies will decline somewhat in the year ahead, permitting a modest increase in U.S. and world soybean oil prices.

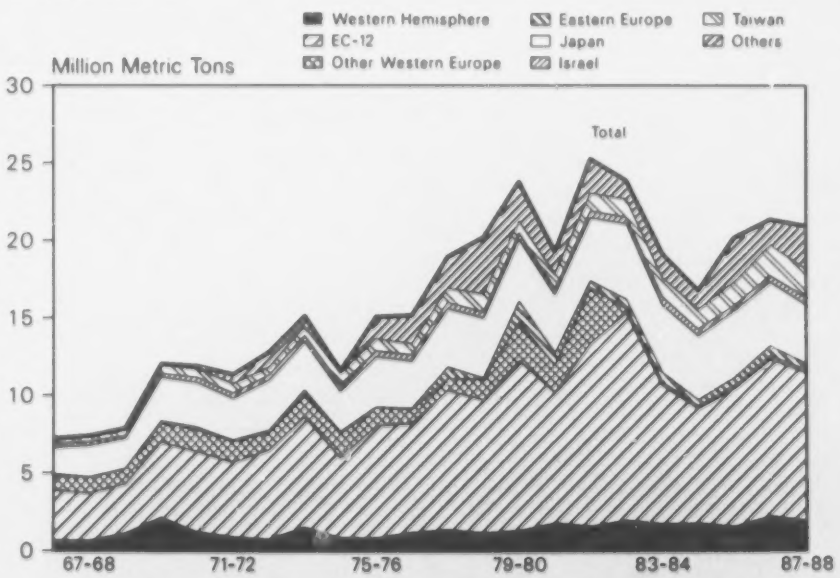
As a background for evaluating U.S. soybean oil export prospects, Figure 43 shows

**Figure 40. U.S. Coarse Grain Exports by Destination, October-September 1966-67 through 1987-88.***




Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; *Grain Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987; November-December 1988.
*From 1982-83 on, the EC is EC-12.

**Figure 41. U.S. Soybean Exports by Destination, October-September 1966-67 through 1987-88.**



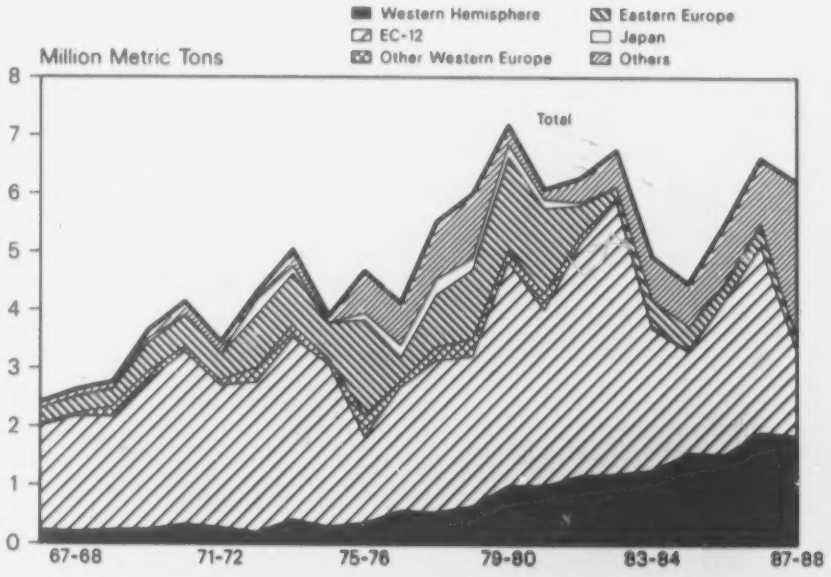

Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; *Grain Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987; November-December 1988.

a modest long-term upward trend in exports until the early 1980s, despite large year-to-year fluctuations. Since then, U.S. exports have trended lower in the face of growing competition. Basic growth in demand for vegetable oil reflects an annual population growth of more than 2 percent in most developing nations. In addition, per capita fat and oil consumption in these countries is moderately sensitive to changes in per capita incomes. The long-term upward trend of population and incomes in developing countries appears likely to push U.S. soybean oil exports irregularly higher in the years ahead. Growth will be restrained somewhat by expanded production of palm and rapeseed oil. In contrast to developing nations, per capita fat and oil consumption in most industrialized nations already is large and is expected to increase only slowly. Thus, developing countries are likely to remain the leading export markets for U.S. soybean oil. Because soybean oil competes with a wide range of other fats and oils, large year-to-year fluctuations in U.S. soybean oil exports are likely to continue in the foreseeable future, due to fluctuations in weather and production of competing products.

Major products that compete with soybean oil are butter, lard, tallow, sunflowerseed oil, cottonseed oil, rapeseed oil, peanut (groundnut) oil, palm oil, coconut oil, safflower oil, olive oil, and fish oil. Compared to many competing oilseeds, soybeans have a relatively low oil yield (18 percent) and a relatively high protein meal yield (80 percent). Long-term global demand for soybean meal has grown more rapidly than the demand for soybean oil, partly because of strong dietary shifts toward more meat and poultry consumption. That shift took place as incomes increased in rapidly and moderately developing economies. This has generated long-term growth in demand for livestock and poultry feed ingredients and relatively slower growth in demand for fats and oils. In addition, soybeans have faced strong competition from rapid growth in production of several high-oil-content oilseeds.

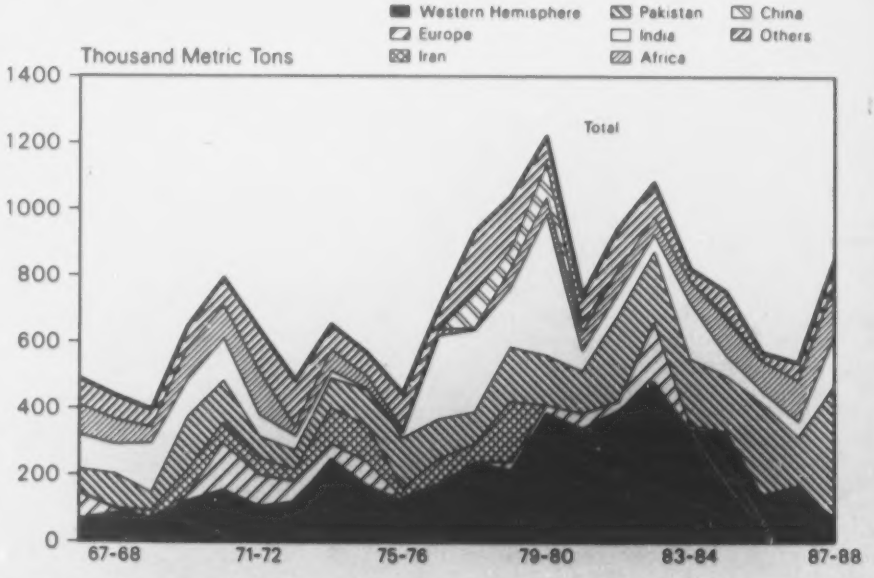
In the years ahead, indications point to sharply increased competition from palm oil production and exports that will continue to restrain long-term growth of U.S. soybean oil exports. Tree plantings in major producing regions of Malaysia expanded sharply in recent years and may continue to expand into the early 1990s. In addition, improved management practices have the potential to increase palm oil production per hectare in the years ahead.

**Figure 42. U.S. Soybean Meal Exports by Destination, October-September 1966-67 through 1987-88.***




Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; *Grain Market News* (Independence, Mo.), various issues; Foreign Agricultural Service, *Foreign Agricultural Circular: Oilseeds and Products*, FOP 11-86, November 1986, U.S. export sales April 3, 1986, and April 2, 1987; and Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement; November-December 1988.
*From 1983-84 on, the EC is EC-12.

**Figure 43. U.S. Soybean Oil Exports by Destination, October-September 1966-67 through 1987-88.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: Oilseed and Products*, various issues, U.S. export sales April 3, 1986, and April 2, 1987; and Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement; November-December 1988.

From the viewpoint of the U.S. soybean industry, those forces indicate a need for continued priority on market development for soybean oil in developing nations, and for development of new industrial products from soybean oil.

**U.S. Wheat Exports by Destination**

Figure 44 shows substantial changes in destinations of U.S. wheat exports since the late 1970s. The most pronounced changes in 1986-87 and 1987-88 were abrupt increases in USSR and Chinese purchases of U.S. wheat after low levels of purchases or absences from the U.S. market the previous two years. U.S. wheat exports to the Middle East also increased sharply in the last few years, reflecting heavy targeting of the U.S. Export Enhancement Program (EEP) to several countries in that area. Reduced European imports since the early 1980s reflect increased wheat production in that area. While Western Europe is now a net exporter of wheat, much of its crop consists of soft wheat varieties. The U.S. continues to export some hard wheat and durum wheat to Western Europe to meet specific needs.

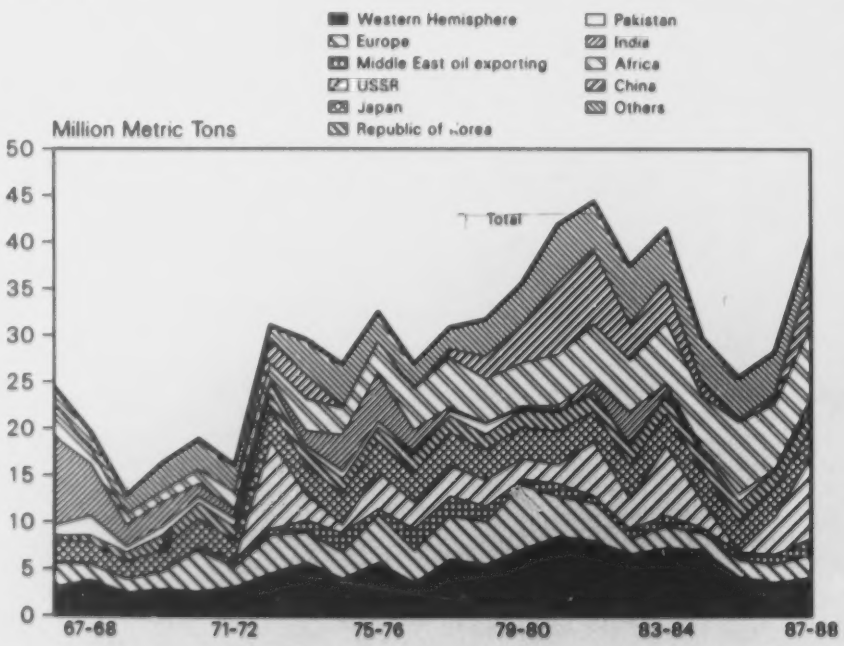
U.S. wheat exports to Latin American nations continued a long-run upward trend except for a temporary interruption in 1987-88. The Western Hemisphere and Africa together accounted for slightly over half of all U.S. wheat exports in the 1986-87 marketing year. But their share of U.S. wheat exports fell to about one-third in 1987-88 and slightly over one-fourth in 1988-89. Exports to India dropped to zero in 1985-86 and 1986-87 as a result of that nation's increased domestic production, large carryover stocks, and its internal pressure to export wheat. However, severe Indian drought in 1987 shifted that country to an importer of U.S. wheat in 1987-88.

Future trends in U.S. wheat exports will depend on how extensively the EEP is used. The program was begun in mid-1985 and has been used aggressively since then. Other influences on U.S. wheat exports will include foreign production trends, an expanding global population, and expected modest world economic growth. The EEP is intended to meet subsidized competition from other wheat exporters, and is expected to be given substantial emphasis for the next few years. Depending on foreign weather and production responses of other exporters to lower world wheat prices, the EEP may set the stage for slight growth in U.S. wheat exports in the early 1990s. But, technological developments in wheat production in India, China, and the EC appear to be nonreversible and are likely to generate significant competition in world wheat export markets provided weather is favorable. Foreign supplies may be moderated slightly by shifts of some marginal land away from wheat production in Canada, Argentina, and Australia in response to low world wheat prices. Price uncertainty may also encourage some reduction in fertilizer application rates on wheat in non-EC countries. That reduction may slow the upward trend in wheat yields.

Figure 44 also shows large year-to-year variations in U.S. wheat exports during the past two decades. This variability is likely to continue and will contribute to significant year-to-year changes in U.S. and world wheat prices. Variability of U.S. exports is related partly to fluctuating production in four important areas: India, China, the USSR, and Australia. The first three are populous nations with a history of substantial variations in rainfall and temperatures from one year to the next. Their import requirements are inversely related to the size of domestic production.

Australia has a highly variable climate, is sparsely populated, and is a major exporter of wheat. When Australia's weather is favorable for wheat production, the U.S. tends to face increased competition in world wheat markets. In contrast to the U.S., Australia and other wheat exporting nations do not have a policy of accumulating reserve stocks when production is large. As a result, the U.S. often is left as a residual supplier to world markets. When world supplies are large and world prices are low, the U.S. traditionally accumulates reserve stocks to support prices. Conversely, when world grain supplies are reduced, U.S. policies encourage use of reserve stocks to fill the supply gap caused by reduced foreign crops, as in 1987-88. With the dramatic changes in U.S. price support and reserve policies spelled out in the Food Security Act of 1985, the U.S. role

**Figure 44. U.S. Wheat Exports by Destination, October-September 1966-67 through 1987-88.**




Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; *Grain Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, November-December 1987; November-December 1988.

as a residual supplier and holder of reserve stocks diminished somewhat.

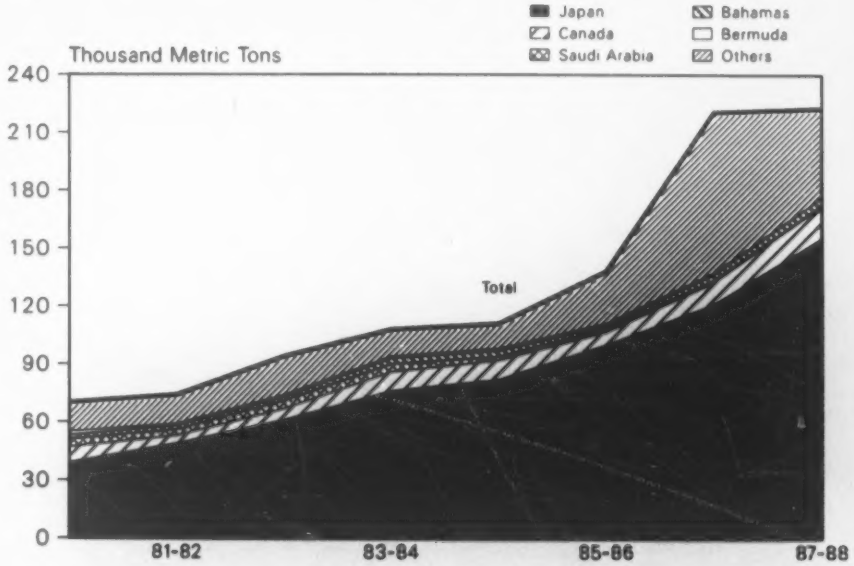
### Trends in U.S. Red Meat and Poultry Exports by Destination

The major export markets for U.S. beef are Japan and Canada, and more recently Brazil and the EC. Japan now accounts for well over half of all U.S. beef exports (see Figure 45). The Japanese market for U.S. beef has grown substantially since the mid-1970s, partly in response to pressures from the U.S. government for Japan to ease its import restrictions. U.S. beef exports to Brazil increased sharply in 1986-87 due to shipments of beef from the U.S. government dairy herd buy-out program, which was designed to curtail surplus milk production. On a tonnage basis, total U.S. beef exports now are about four times as large as in 1977-78, with much of the growth due to increased Japanese purchases.

Growth in U.S. beef exports will depend heavily on trade negotiations to ease import barriers in Europe and other areas. The U.S. government has had considerable success in negotiating with Japan to reduce its beef import barriers, partly because of the large positive trade balance Japan has with the U.S. While some easing of restrictions is possible in other countries, major changes probably should not be expected in the near future. Foreign beef producers are extremely sensitive to changes in import policies that would increase supplies and depress prices for their products. And, in several beef importing nations, agricultural producers have substantial political influence. Thus, resistance of foreign producers to easing of trade barriers is likely to continue as a restraining influence on the growth of U.S. beef exports, although some further growth appears likely in the years ahead.

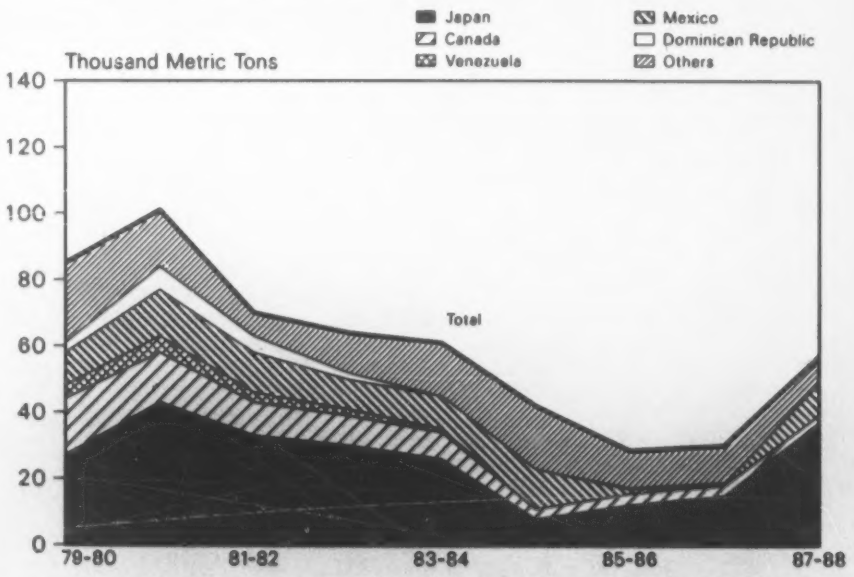
Major destinations for U.S. pork exports include Japan, Mexico, and Canada as shown in Figure 46. Pork exports from the U.S. to Canada have been in a major downtrend since the late 1970s, partly as a result of the strong U.S. dollar relative to the Canadian currency, which discourages U.S. exports. With declining exports to Mexico and Canada, U.S. pork exports in 1987-88 were only slightly over half as large as a decade earlier. Declining U.S. pork exports also reflect strong competition from pork exporting nations in Western and Eastern Europe. With declining exports since the mid-1970s, U.S. pork export prospects are uncertain. But, a possible weaker U.S.

**Figure 45. U.S. Beef and Veal Exports by Major Destinations, 1980-81 through 1987-88 October-September Fiscal Years.**



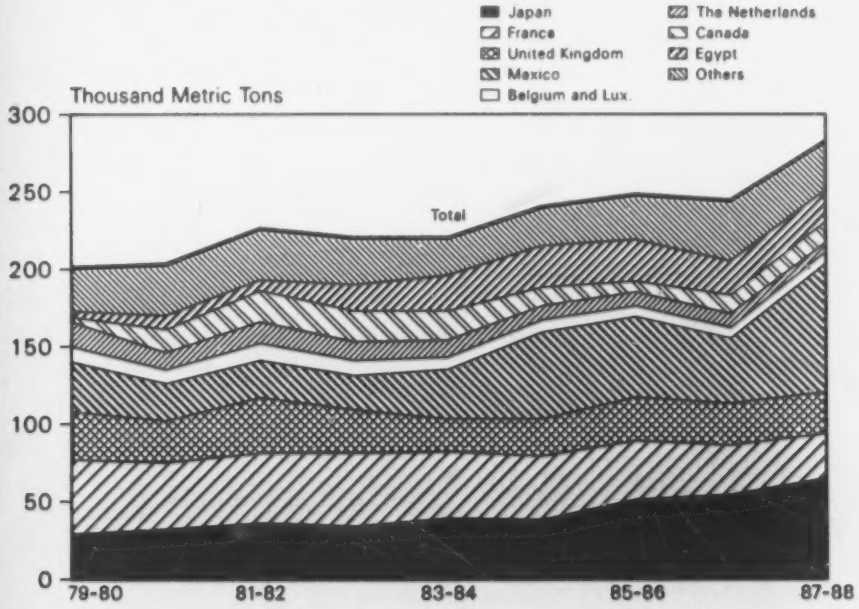

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement; November-December 1988; various other issues.

**Figure 46. U.S. Pork Exports by Major Destinations, 1979-80 through 1987-88 October-September Fiscal Years.**



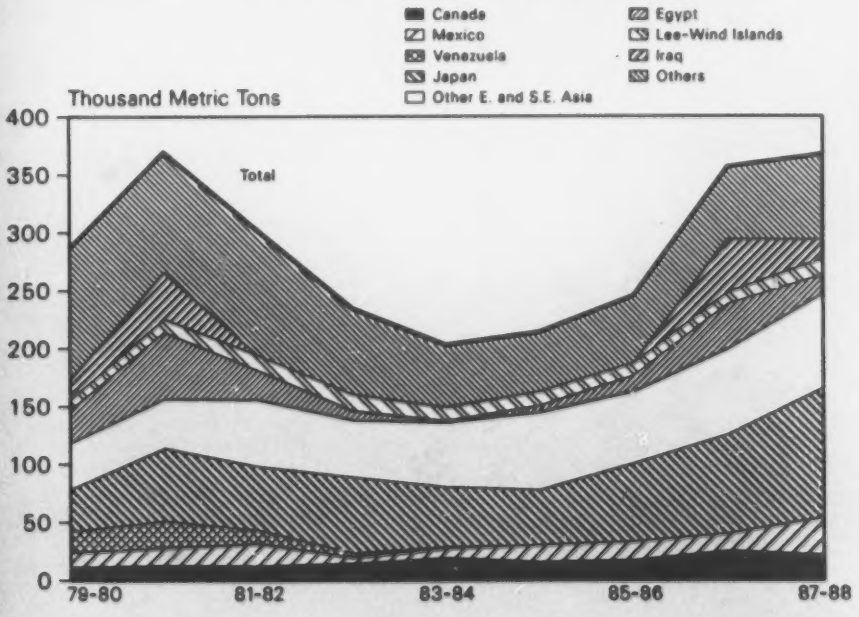

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement; November-December 1988; various other issues.

**Figure 47. U.S. Exports of Edible Offals and Variety Meats by Major Destinations, 1979-80 through 1987-88 October-September Fiscal Years.**




Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement; November-December 1988; various other issues.

**Figure 48. U.S. Fresh and Frozen Chicken and Turkey Exports by Major Destinations, 1979-80 through 1987-88 October-September Fiscal Years.**




Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement; November-December 1988; various other issues.

dollar and world economic growth may help to stabilize or slightly increase export demand for U.S. pork in the early 1990s, especially in Far East markets.

In contrast to pork exports, edible offals and variety meats have exhibited a slight upward trend since the mid-1970s (see Figure 47). Major destinations for exports of these products include Japan, Western Europe, Mexico, Canada, and Egypt. In the last several years Egypt has emerged as a significant new growth market for U.S. edible offals and variety meats. By 1987-88, it accounted for 7 percent of all U.S. exports of these products and ranked fifth in size of purchases, behind Mexico, Japan, France, and the United Kingdom.

U.S. poultry meat exports were in a sharp downward trend earlier this decade, as shown in Figure 48. But, exports of these products in fiscal 1987-88 moved slightly above the record 1980-81 volume. Declining poultry meat exports in the early 1980s reflected subsidized competition from the EC and Brazil, adverse effects from the strong U.S. dollar from 1981 to 1985, and sluggish world economic growth. Reduced exports to Iraq, Egypt, Mexico, Venezuela, and several countries in the "Others" category in Figure 47 accounted for much of the earlier decline.

Growth in U.S. poultry meat exports to southeast and eastern Asian markets including Japan has been substantial in the last few years. Expanded U.S. poultry meat exports in 1987-88 were concentrated largely in shipments to Japan, Spain, and Mexico due to economic growth in these nations. Increased export quantities pushed the value of 1987-88 U.S. poultry meat exports 4 percent above a year earlier. The future of U.S. poultry meat exports will depend heavily on the exchange rate of the U.S. dollar and the strength and timing of changes in world economic growth.

# U.S. Price and Income Support Levels Continue to Decline[42]

U.S. price and income support levels for major crops continued to decline in 1988 and 1989, in response to administrative authority provided in U.S. farm laws. Current support mechanisms grew out of a six-month congressional debate in 1985 on ways to improve the U.S. agricultural position in world markets. The resulting legislation allowed sharply lower price support levels on major crops beginning in 1986, with additional declines in government price support levels permitted through 1990 at the discretion of the U.S. Secretary of Agriculture. The legislation, known as the Food Security Act of 1985, continues a two-fold approach for income support to U.S. producers of major crops. Target prices are a key element of this support system. They are used to determine the amount of deficiency payments or direct payments to farmers participating in acreage reduction programs if market prices during a specified time period are below target levels. Target prices for major U.S. crops were frozen at 1984-85 levels ($3.03 per bushel for corn, $4.38 for wheat) through the 1987-88 marketing year, but have been modestly reduced for 1989-90 ($2.84 per bushel for corn on the 1989 crop, $4.00 for wheat on the 1990 crop). Deficiency payments based on these target prices are available only to farmers who participate in U.S. government land-idling programs and meet appropriate conservation requirements on the land removed from production. Thus, part or all of the deficiency payment may be viewed as a compensation for withdrawing land from production. There is a target price for wheat, corn, oats, barley, sorghum, cotton, and rice, but not for soybeans or sunflowerseed.

The other major component of the U.S. price support system is the loan rate mechanism. The price support loan program dates back to U.S. price support systems that originated in the depression years of the 1930s. Farmers participating in government land-idling programs (except for soybeans, where no land-idling programs are in effect) may store their crops beyond harvest and receive a government loan at the designated loan rate per bushel. These loans have a nine-month maturity. At any time during this period, the farmer may repay the loan plus accumulated interest and sell or use the grain. An alternative often used when cash prices are below the loan rate is for the farmer to deliver the grain (or other crops) to the government in fulfillment of the loan. In this case, principal and interest on the loan need not be repaid. This process, known as forfeiture of price support loans, provides the primary increase in grain stocks owned by the Commodity Credit Corporation (CCC), an agency of the U.S. government. Loan rates vary from county to county across the U.S., due to differences in transportation costs from local producing areas to major export markets. There are thousands of counties in the U.S. each of which has a local office to administer the price support program. For example, Iowa—the leading corn producing state in the U.S.—has 99 counties and corn loan rates that vary by approximately $.18 to $.19 per bushel from the highest to the lowest level. The loan rates often have served as a floor on the U.S. season average price.

### Corn Loan Rates Down

The Food Security Act of 1985 provides much more discretionary authority to the Secretary of Agriculture in setting crop loan rates than in the past. For example, the 1989-crop U.S. average loan rate for corn was set at a statutory minimum level of $2.10 per bushel, down from $2.55 on the 1985 crop. However, the agriculture secretary is permitted to reduce the statutory level as much as 20 percent if the U.S. average price received by farmers in the previous year was not more than 110 percent of the loan rate. This adjustment was made for the 1986 through 1989 corn loan rates since market prices for the previous year's crops were depressed. The agriculture secretary chose to set the 1986, 1987, 1988, and 1989 loan rates at the lowest allowable level. As a result, the effective 1989 national average corn loan rate is $1.65 per bushel, down $.90 per bushel ($35.44 per metric ton), or 35 percent, from the 1985 crop loan rate.

Under current U.S. laws, the statutory loan rate for the 1990 corn crop will be 75 to 85 percent of the immediately preceding five-year average price received by farmers, excluding high and low years, and with a provision that the statutory loan rates cannot be reduced more than 5 percent from the preceding crop year in any one year. These adjustments will reduce the nominal loan rate for U.S. corn to $1.57 per bushel ($61.86 per metric ton) in 1990.[43] In addition, the effective loan rate for 1989 through 1990 crops could be reduced from the nominal level by undetermined amounts resulting from the Gramm-Rudman-Hollings Balanced Budget and Emergency Deficit Reduction Act.

Additional flexibility in U.S. price support levels is provided by the Secretary of Agriculture's authority to use marketing loans or loan deficiency payments if necessary to compete effectively in world markets. Marketing loans would allow producers to repay their price support loans at the higher of either the market price or 70 percent of their loan rate if market prices are below the loan. Loan deficiency payments would provide direct cash payments to producers to compensate for cash prices that are below the loan rate, if the producer chooses to forego use of the government loan program. Payment-in-Commodity (PIC) certificates provided by the 1985 Food Security Act were used from 1986-87 through 1988-89 as a tool to permit market prices for corn and sorghum to drop below government loan rates and encourage utilization. In 1988-89, U.S. producers used the certificates primarily to redeem grain under extended price-support loans from pre-1986 crops. This tool enhanced the U.S. competitive position in world markets. PIC certificates allow farmers to repay price support loans at substantially less than the government loan rate at times when world market prices are depressed. That allows for greater flexibility in U.S. export prices in order to meet foreign export competition.

These policy tools, which are likely to be continued in the next few years, will keep the effective U.S. price support levels well below the average of the 1979-85 period. They are a signal that the U.S. Congress and U.S. administrations are serious about maintaining increased competitiveness of U.S. agricultural exports. To continue the same degree of flexibility in the U.S. export system, the U.S. Congress will need to reauthorize their use when current farm legislation expires in 1990. Implementation of these drastic changes in U.S. support mechanisms has had far-reaching effects on farmers in other grain exporting nations, grain exporting firms, other international agribusiness industries, and costs of government agricultural programs in the U.S. and other nations. The U.S. price support programs traditionally supported world prices, with foreign exporters often pricing their products slightly below U.S. support levels, if necessary, to clear the market and avoid increased carryover stocks. The Food Security Act of 1985 indicates other exporting nations must share the burden of matching market-available supplies with effective demand, or pay a penalty in the form of depressed prices resulting from the U.S. deviation from its traditional role as residual supplier.

### Loan Rates for Other Crops Also Lowered

Loan rates for other grains are established through formulas similar to those for corn. For example, the nominal U.S. average loan rate for 1990 crop wheat was reduced to $2.06 per bushel ($75.71 per metric ton), down $1.24 per bushel from the 1985 level.[44] The effective loan rate could, under certain conditions, be reduced even more through cuts manadated by the Gramm-Rudman-Hollings balanced budget legislation or by implementation of marketing loans or loan deficiency payments.

The 1986 through 1988 average soybean loan rates were lowered to $4.77 per bushel ($175.30 per metric ton), from $5.02 in 1985. For 1989 and 1990 crops, the soybean loan rate is scheduled to be 75 percent of the immediately preceding five-year average price received by farmers, excluding the high and low years, with a $4.50 per bushel minimum level and a constraint that the loan rate for any individual year may not be reduced more than 5 percent from the previous year.[45]

### U.S. Target Prices to Decline in 1990

While loan rates are the main price support mechanism in U.S. farm programs for most major crops, income support for producers is linked more directly to target prices. For 1989 crop corn, producers participating in the government acreage control program will be eligible for deficiency payments to make up some or all of the difference between the target price and the market price if prices received by farmers are below the target price. Maximum deficiency payments for this year's corn crop will be $1.19 per bushel, the difference between the loan rate of $1.65 per bushel and the target price of $2.84. If the season average market price is above the loan rate, participating farmers will be paid only the difference between the market price and the target price. Participating farmers would receive the maximum deficiency payment rate on normal production on area planted to corn if the average U.S. farm market price for the September 1989-August 1990 corn marketing year is at or below the $1.65 loan rate. Part of these payments will be made in cash and part could be made in PIC certificates. In addition, payments on the first $.78 per bushel of the corn deficiency payment ($2.84 target price minus $2.06 statutory loan) are subject to a $50,000 payment limit per farmer to avoid unduly large benefits to large farms. Payments are available only to farmers who idle at least 10 percent of their historical corn area, making them both an income support and a payment for idling land. By 1990, corn target prices are scheduled to decline to $2.75 per bushel ($108.28 per metric ton).

For wheat, the target price of $4.00 per bushel for the 1990 crop provides maximum wheat deficiency payments of $2.05 per bushel ($75.34 per metric ton). As with corn and other feed grains, a $50,000 payment limitation per farmer applies with some exceptions. U.S. soybeans have no target prices and consequently no direct government payments are available for their production. Although there has been no direct land-idling program for soybeans in the entire history of U.S. government supply-control programs, the nation's soybean area is being affected by the long-term Conservation Reserve Program and has been affected indirectly by land-idling programs for other crops.

### Supply Control Provisions

For over half a century, the U.S. has taken primary responsibility for supply management in world grain markets in times of surplus production. The Food Security Act of 1985 provides for a continuation of that role if sharply lower price support levels fail to generate enough additional domestic and export demand to balance supplies and utilization with a realistic level of U.S. grain carryover stocks. For corn and other feed grains (coarse grains), producers are required to idle from 12.5 to 20 percent of their feed grain base acreage to obtain program benefits, if U.S. old-crop corn carryover stocks are more than 2 billion bushels (50.8 million metric tons). If carryover stocks are at or below 2 billion bushels, no more than 12.5 percent of an individual farm's feed grain base area would need to be idled to qualify for program benefits. For wheat, land-idling requirements for participation range from 15 to 30 percent of a producer's base area when old-crop U.S. wheat carryover stocks exceed 1 billion bushels (27.2 million metric tons). Maximum land-idling requirements are 15 percent of the base when carryover stocks drop to or below 1 billion bushels. U.S. soybeans continue to have no land-idling provisions.

In addition to land-idling features in individual commodity programs, the Food Security Act of 1985 established a long-term program that is required to idle up to 40 to 45 million acres (16.2 to 18.2 million hectares) of erosion-prone cropland for 10 years. The land-idling goal is intended to be reached by 1990 and would represent 11 to 12 percent of all U.S. cropland. Land idled under this program must be planted to trees or grass. Mechanical harvesting of these products is forbidden during the life of the contract unless temporarily authorized under emergency drought relief measures. In return for removing the land from production, land owners receive an annual rental payment that must not exceed the prevailing commercial rental rate for comparable cropland in the area where the producer is located. Land being idled under this program is well below average in productivity, because it represents steeper-sloping fields and land in less humid areas that is subject to wind erosion. A sizable part of the land idled under the long-term program is coming from wheat, other small grains, and soybean production. Through late spring of 1989, U.S. farmers had enrolled 30.6 million acres (12.4 million hectares) in this program. By 1996, land will begin to be released from the Conservation Reserve Program as the 10-year contracts expire. The 1985 farm act also contains "sodbuster" and "swampbuster" provisions, which make farmers bringing such land into production ineligible for any U.S. government program benefits.

### Grain Reserve Programs

In the first half of the 1980s, the Farmer-Owned Grain Reserve Program was a key supply management tool in U.S. farm policies. When supplies exceeded market demand, farmers were paid to continue storing grain for three to eight years and were permitted to sell the grain only if prices rose sharply or if the grain was deteriorating in quality. The reserve program remains in effect through mid 1990, but by that time reserve stocks of both wheat and feed grains may be nearly exhausted. Future quantities held in the reserve will depend on the ability of U.S. production to exceed market demand. U.S. legislation passed by Congress in 1985 and early 1988 places upper and lower limits on the amount of grain in the reserve. For wheat, the normal upper limit is 30 percent of estimated total annual domestic and export usage. The normal lower limit is 300 million bushels (8.2 million metric tons). The normal upper limit on feed grain reserve stocks is 15 percent of total annual domestic usage. The minimum feed grain reserve is 450 million bushels (11.4 million metric tons). Higher reserves equal to 110 percent of these maximum levels can be estab-

lished at the secretary's discretion. Maximum limits on reserve stocks became effective in the 1986-87 marketing year and prevented entry of 1986 and 1987 crops into the reserve.

### Implications for U.S. and World Agriculture

The 1985 Food Security Act is a complex piece of legislation that could be modified by Congress in 1990 but may provide the overall direction for U.S. farm policy into at least the early part of the next decade. It represents a shift in U.S. price support programs in the direction of the EC support system, with domestic crop incomes supported well above world levels through the target price system. However, one important difference from the EC grain price support system is that U.S. farmers generally are required to idle a substantial part of their cropland to qualify for price and income supports. The exception is where carryover stocks are projected to drop to relatively low levels. The policy changes in the 1985 legislation have exerted sharp downward pressure on U.S. and world grain prices from levels of the late 1970s and early 1980s. Low U.S. price supports should reduce incentives for increased corn and wheat production in other exporting nations, and are encouraging increased grain utilization by making livestock and poultry products affordable to a larger segment of the developing world. These developments and the severe 1988 North American drought moved global grain production and utilization toward equilibrium levels. But if weather improves, U.S. and world coarse grain stocks could increase from current low levels.

Reduced U.S. price support levels cut grain prices received by farmers in such exporting nations as Canada, Argentina, Brazil, Australia, South Africa, and Thailand from levels of the early 1980s. In countries such as the EC nations where domestic agricultural programs support prices well above world levels, government expenditures for farm programs have offset downward pressure on world grain prices. Political pressure in the EC is shifting toward lower agricultural price supports and small scale cropland-idling programs. In importing nations, lower prices are advantageous for domestic consumers in the short run, but will work against incentives for increased self-sufficiency in agricultural products in the longer run. In addition, the lower level of world prices has increased temptations for the U.S. and other nations to follow protectionist trade practices such as import restrictions to shield domestic producers from foreign competition. For example, in 1987 Canada implemented an import tax on U.S. corn to protect Canadian corn producers.

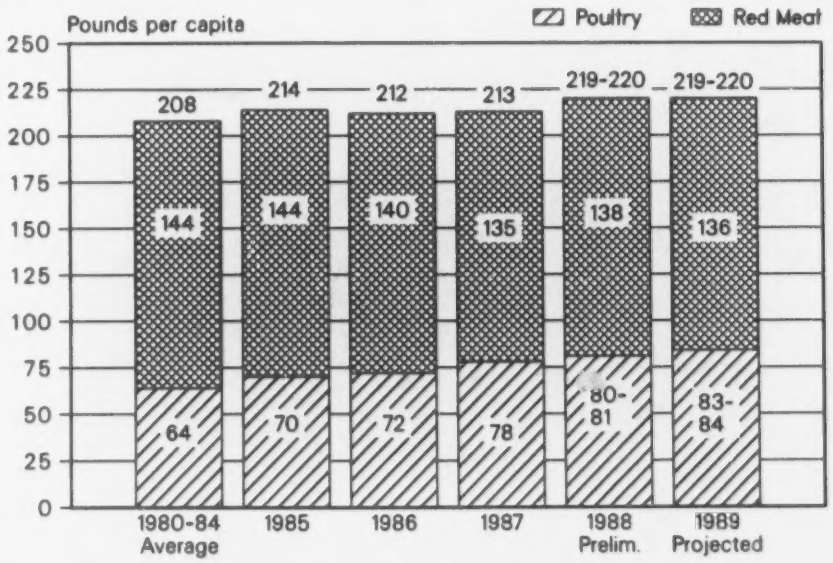
In the struggle to expand agricultural export shares, a trade subsidy war has been waged by the U.S. and the EC. Export subsidies were used heavily on wheat and barley and, to a lesser extent, on sorghum and vegetable oils from 1987 through late 1989. In some instances the export subsidies reduced the cost of the product to foreign buyers by one-fourth or more from world market price levels. But, with the record decline in U.S. wheat carryover stocks in 1988 and 1989, use of U.S. export subsidies may diminish in the next few years.

# U.S. Shift to Increased Poultry Meat Consumption Continues, Impacts Feed Demand

In the last decade, a major change occurred in U.S. diets. Consumers reduced consumption of red meat (beef and pork) and dramatically increased consumption of poultry (chicken and turkey).[45] These trends, shown in Figure 49, reflect a number of influences including consumers' desire to reduce intake of fat and cholesterol, thus reducing the risk of cardiovascular disease, the leading cause of death in the U.S. In addition, several new products were developed by the poultry industry and marketed through fast-food restaurants. The poultry industry also developed convenience products portioned and packaged for quick preparation at home to meet needs stemming from sharply increased employment of women. Innovations in poultry products have substantially outpaced those in the red meat industry. The rapid adoption of microwave ovens in American homes also may have contributed to this trend, because poultry products in some cases are more suited for microwave cooking than other types of meat.

These trends are expected to continue in the next few years and also may occur in other industrialized nations. If so, the changing composition of meat consumption may have important implications for grain producers, handlers, and exporters. Poultry production requires much less grain per pound of meat than pork and grain-fed beef. Therefore the trend toward poultry production is releasing a modest additional amount of U.S. grain for export or other uses. The grain would not have been available under previous dietary patterns. Similar trends in other areas such as Western Europe, Canada, and the USSR could slightly increase world availability of grain for export and slightly restrain the growth in global grain trade. These trends also have important implications for the red meat industry in areas of product innovation, pressures to increase feed conversion efficiency and productivity, investment prospects in industries producing inputs used in livestock production, and in livestock marketing and processing industries.

**Figure 49. U.S. Per Capita Meat Consumption, 1980-89.**




Source: U.S. Department of Agriculture, Economic Research Service, *Livestock and Poultry Situation and Outlook Report*, LPS-29, May 1988; LPS-35, May 1989; various other issues.

# U.S.-European Community Trade Tensions Stabilize[47]

U.S.-EC trade tension increased sharply from 1986-87 through mid-1988 partly because of the U.S. position on the General Agreement on Tariffs and Trade (GATT) negotiations (discussed in a later section of this report), continued large EC export subsidies on farm products, and the negative impact of the recent entrance of Spain and Portugal into the EC on U.S. grain exports. Other developments contributing to trade tension were continuing large excess grain supplies in both the U.S. and the EC, the EC's shift to exports of maize (corn) to outside countries, a threatened EC tax on vegetable oils, sharply expanded EC oilseed production (noted in the oilseeds section of this report), growing EC and U.S. costs of farm programs, and a continued large U.S. nonagricultural trade deficit with EC nations. After threats and counterthreats that large duties would be placed on imports of key farm products, the two sides reached a temporary reconciliation when the EC agreed to expand its grain imports to compensate for Spain's and Portugal's entrance to the community. With sharply reduced U.S. grain supplies as a result of the 1988 U.S. drought and higher world prices, the size of export subsidies used by both countries declined substantially and trade tension between the U.S. and EC appeared to be stabilizing rather than escalating by mid-1989.

The four-year U.S.-EC maize and coarse grain agreement, reached in February 1987, included EC commitments to permit two million metric tons of corn (maize) and 0.3 million metric tons of sorghum to be imported into Spain annually under reduced levies, and eliminated Portugal's requirement to purchase 15 percent of its coarse grain import needs from other EC nations.[48] The agreement also extended the EC's zero duty on corn gluten feed and soybean meal to Spain and Portugal. But Spanish imports of grain substitutes such as corn gluten feed, distillers, dried grains, and citrus pellets can be counted toward its allowed quantity of coarse grain imports.[49] Spain's and Portugal's imports of these products are likely to increase considerably in the years ahead because of their zero import duty status and absence of import levies. Over the longer term, the agreement is not likely to greatly alter Spanish and Portuguese imports from patterns that would otherwise have occurred. In the short run, it does not provide guaranteed access of U.S. grain to Spain and Portugal because other non-EC countries can compete for that market. Moreover, it does not prohibit the EC from exporting an equal volume of its own coarse grain and wheat to offset required non-EC imports into Spain and Portugal. Thus, the February 1987 agreement is not likely to be a permanent solution to U.S.-EC trade tension stemming from the admission of Spain and Portugal to the EC.

# Oil Importing and Exporting Nations and U.S. Agricultural Exports

From the last quarter of 1985 through mid-1989, world petroleum prices have been quite volatile. They declined by over 50 percent then rose by about that much in early 1989 in response to production and shipping problems in the North Sea and Alaska, and changes in OPEC policies. Volatility of energy prices affects U.S. agriculture through input costs and through effects on aggregate demand in oil importing and exporting nations. If lower oil prices develop, they have the potential to affect U.S. agriculture in both positive and negative directions. On the positive side, energy is a major input in both the agricultural and nonagricultural sectors of the world economy. Its price affects the cost of producing many major farm inputs, as well as costs of conditioning, processing, and transporting agricultural products. Lower energy costs reduced U.S. and foreign inflation rates from 1986 through 1988, permitting slightly lower interest rates. These gains were reversed in early 1989. A renewed downturn in energy prices in the early 1990s probably would have an effect similar to that of 1986-88. Also, a decline in energy costs would slightly reduce per unit production costs for U.S. farm products, and therefore could have a positive effect on the financial condition of the U.S. agricultural sector.

Lower petroleum prices would tend to be a positive influence on demand for farm products in the U.S. and in a large number of oil-importing nations. Reduced oil prices would provide consumers with additional funds that could be used for dietary improvements. If energy prices remain at reduced levels for several years, they would be likely to generate increased demand for livestock and poultry products in oil-importing developing nations. In the mid-1980s, U.S. consumers used part of the energy cost savings to reduce debts and replace durable goods worn out during the years of high interest rates and rapid inflation. Even so, lower petroleum prices than those in the late 1970s and early 1980s probably had a slight positive effect on U.S. demand for farm products during the 1986-88 period. The demand effect may have been largest in such major oil-importing countries as Japan, Korea, Taiwan, Brazil, and Argentina, and to a lesser degree in Eastern and Western Europe. If energy costs decline to late 1988 levels, Brazil and Argentina would see accelerated domestic economic growth with a resulting increase in domestic demand for farm products that will reduce export availability. Reduced energy import costs also would be a positive influence on the balance of trade for these nations, and could slightly ease external debt-servicing problems.

Lower petroleum prices also would have a negative impact on U.S. agricultural exports to oil-exporting nations. U.S. agricultural exports to these countries increased substantially in the 1970s and early 1980s. In the 1986-88 period, sharply reduced purchasing power as a result of lower oil prices slowed the growth in demand for U.S. farm products in most oil exporting nations. But, in some cases, lower purchasing power was partially offset by expanded U.S. government export assistance programs that substantially lowered the cost of purchasing U.S. farm products.

U.S. agricultural exports most likely to be affected by changing petroleum prices are poultry and poultry products, other meats, and wheat. Imports of these products by oil-exporting nations grew rapidly from 1972 to 1981 (see Table 19) as large oil revenues brought dietary changes. Since the early 1980s, however, agricultural imports of oil-exporting nations have become variable from year to year. Growth in the 1970s and early 1980s was most pronounced for poultry imports, with a 939 percent expansion between 1972 and 1981. But, by 1984, poultry imports by oil exporters had slipped 29 percent below the 1981 record, with declines in most areas except the North Sea area and other developing nations. Other meat imports by oil exporters rose by 165 percent from 1972 to 1981 and remained fairly stable since that time. Wheat and flour imports by these nations more

**Table 19. Imports of Selected Agricultural Products by Oil-Exporting Nations, 1972-82 and 1984-87.**

| Product and Region | 1972 | 1977 | 1980 | 1982 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|---|---|---|
| **Poultry (000 metric tons)** | | | | | | | | |
| Middle East & N. Africa | 23.87 | 192.01 | 458.87 | 531.20 | 473.94 | 414.69 | 403.75 | 450.88 |
| Western Hemisphere | 6.84 | 25.60 | 24.89 | 39.06 | 37.00 | 39.37 | 36.81 | 41.21 |
| North Sea | 9.63 | 10.69 | 28.70 | 28.21 | 54.29 | 63.90 | 93.37 | 86.97 |
| USSR | 44.94 | 120.67 | 159.02 | 260.25 | 133.84 | 141.16 | 175.12 | 169.27 |
| Other Developing Nations | 1.24 | 20.60 | 23.60 | 30.01 | 30.39 | 14.13 | 13.28 | 19.16 |
| Total | 86.52 | 369.57 | 695.08 | 888.73 | 729.46 | 673.25 | 722.33 | 767.49 |
| **Other Meats (000 metric tons)[a]** | | | | | | | | |
| Middle East & N. Africa | 51.18 | 434.14 | 916.27 | 1,180.01 | 1,197.12 | 1,105.41 | 1,088.01 | 1,086.35 |
| Western Hemisphere | 127.21 | 232.06 | 168.60 | 218.43 | 219.47 | 267.11 | 249.39 | 284.88 |
| North Sea | 802.89 | 654.22 | 638.25 | 592.39 | 526.23 | 532.45 | 591.35 | 593.48 |
| USSR | 85.00 | 560.60 | 739.57 | 845.61 | 666.25 | 691.52 | 760.85 | 683.94 |
| Other developing Nations | 7.37 | 63.64 | 68.36 | 90.80 | 79.48 | 76.55 | 69.65 | 76.63 |
| Total | 1,073.65 | 1,944.66 | 2,531.05 | 2,927.24 | 2,688.55 | 2,673.04 | 2,759.25 | 2,725.28 |
| **Wheat & Flour (mil. metric tons)** | | | | | | | | |
| Middle East & N. Africa | 4.83 | 10.45 | 14.37 | 14.91 | 20.03 | 18.12 | 17.59 | 20.27 |
| Western Hemisphere | 1.48 | 1.42 | 1.91 | 1.50 | 1.59 | 1.89 | 1.42 | 1.83 |
| North Sea | 4.72 | 4.17 | 2.64 | 2.01 | 1.49 | 2.03 | 2.25 | 2.14 |
| USSR | 8.48 | 7.14 | 16.03 | 22.16 | 27.28 | 20.57 | 16.02 | 18.40 |
| Other Developing Nations | 1.20 | 2.12 | 3.18 | 3.67 | 3.16 | 2.02 | 2.27 | 2.38 |
| Total | 20.71 | 25.31 | 38.18 | 44.25 | 53.55 | 44.64 | 39.55 | 45.02 |

Source: Food and Agriculture Organization of the United Nations, *Trade Yearbook* (Rome, Italy), various issues.
[a]Other meats = meat, fresh, chilled, or frozen, excluding poultry meat fresh, chilled, or frozen.

than doubled from 1972 to 1984, but have since declined by about one-seventh. But wheat and flour imports by the Middle East and North Africa have continued to show an irregular upward trend since 1984. Wheat and flour imports by oil-exporting nations outside these regions have been variable since 1984.

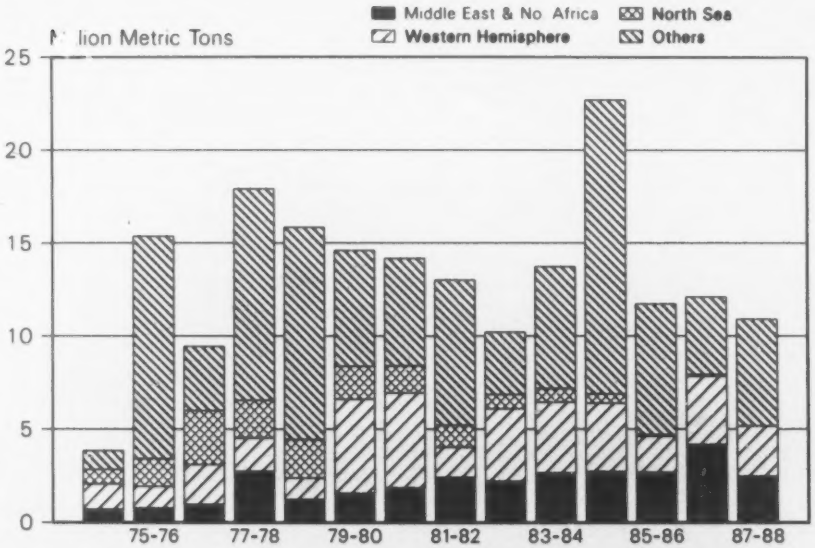
Future U.S. agricultural exports to oil-exporting nations almost certainly will be sensitive to trends in petroleum prices. In mid-1989, higher petroleum prices were increasing oil revenues to Middle East and North African nations significantly from levels of one to two years earlier. Longer-term energy prices will be affected by conservation efforts and new technology in insulation, transportation, heating, and cooling. Other factors will include the possible development of alternative energy sources and petroleum production trends in non-OPEC regions. Some reports indicate that from 1977 to the late 1980s, OPEC's crude oil production declined by nearly 50 percent, while its share of world oil exports dropped from two-thirds to one-third as other oil-producing nations expanded production.

Although it probably will not stop completely, the trend toward energy conservation may slow in the next few years following large gains in automobile and truck fuel efficiency ratings during the past decade. However, it probably will not be halted completely. The decline in petroleum prices in the mid-1980s reduced oil exploration activities and halted production in some marginal producing areas. These developments may gradually tighten world petroleum supplies in the 1990s. OPEC's much smaller market share than in the 1970s, however, may temper increases in petroleum prices in the next one to three years. If so, oil export revenues are likely to continue to restrain growth in oil exporters' purchases of agricultural imports. But the U.S. Export Enhancement Program (EEP) for wheat, flour, and barley has been targeted strongly toward nations in the Middle East and North Africa, and may continue to assist these nations in purchasing U.S. farm products.

### Oil-Exporting Nations Are Substantial Market for U.S. Agriculture

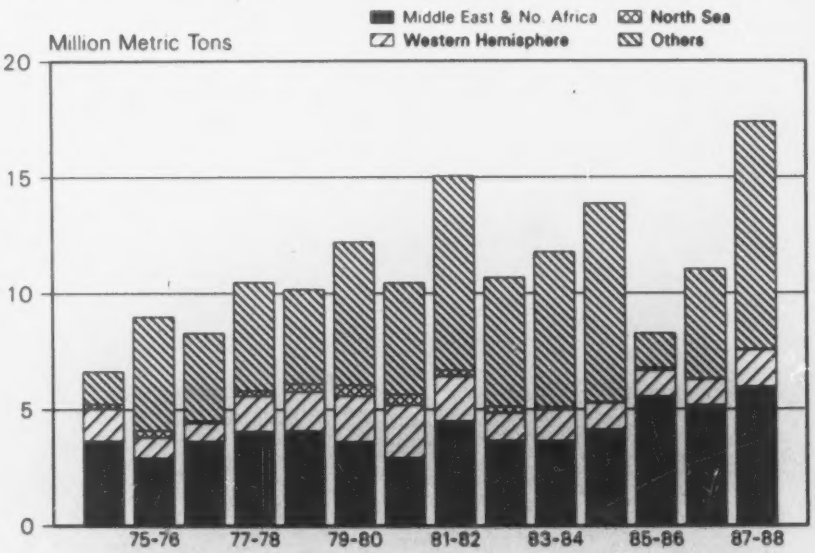
As Figures 50 and 51 show, U.S. corn and wheat exports to Middle East, North African,

**Figure 50. U.S. Corn Exports to Oil Exporting Nations, 1974-75 through 1987-88.**




Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement.

**Figure 51. U.S. Wheat Exports to Oil Exporting Nations, 1974-75 through 1987-88.**




Source: U.S. Department of Agriculture, Agricultural Marketing Service, *Grain and Feed Market News* (Independence, Mo.), various issues; and Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Year 1987 Supplement.

and other Asian oil-exporting, developing nations grew rapidly during the 1970s but experienced considerable variability in the 1980s. Based on preliminary data, combined U.S. corn exports to these areas in the 1988-89 marketing year accounted for about 6 percent of all U.S. corn exports, with an additional 6 percent being shipped to oil-exporting nations in the Western Hemisphere. When the Soviet Union is included, nearly 40 percent of the 1988-89 U.S. corn exports went to oil-exporting nations. Approximately 36 percent of the total U.S. June-May 1988-89 wheat exports went to oil-exporting nations. About 14 percent of all U.S. wheat exports in 1988-89 were shipped to oil exporters in the Middle East and Africa, 7 percent to Western Hemisphere oil exporters, and 2 percent to other non-Soviet oil exporting developing nations. Thirteen percent of all U.S. wheat exports in 1988-89 went to the USSR.

With sizable percentages of U.S. corn and wheat exports purchased by oil-exporting nations, petroleum prices remain a potential influence on grain export trends. But the exact level of U.S. grain exports to these nations will depend on their domestic grain production, priorities placed on food vs. industrial imports, political relationships with the U.S., and, most importantly, the U.S. government Export Enhancement (EEP) and export assistance programs. From 1987 through mid-1989, the EEP for wheat was targeted heavily to Middle East and North African countries as well as the USSR, India, and China. Large U.S. barley sales also were made to Saudi Arabia under the same program. The EEP at times reduced the cost of grain to recipient nations by up to one-fourth to one-third from prevailing market prices and by up to 50 percent or more from levels of the early 1980s. The program helped offset reduced imports caused by restrained oil export revenues. Continued moderate grain prices and steady or slowly declining petroleum prices would support grain import demand in the Middle East and North Africa in the next few years.

Trends in U.S. exports to non-Middle East oil-exporting nations indicate most of those areas have reduced their U.S. grain imports substantially in the last few years in response to various economic forces. Without increased export assistance programs from the U.S., it would not be surprising to see exports to these countries remain near recent levels during the next one to three years. Soviet imports may be influenced by slowly rising petroleum revenues, but will depend heavily on that nation's domestic grain production and the priority given to maintaining or increasing per capita availability of meat, poultry, and dairy products.

Except for shipments to a few oil exporters in the other developing nations category (primarily Malaysia and Indonesia), U.S. red meat and poultry exports to oil-exporting nations performed much less favorably than grains in the last few years. U.S. exports of meat to nearly all oil exporters dropped sharply since the start of the decade. The decline reflects pressure on consumer incomes in some oil-exporting nations and growth in domestic meat production in others.

# Barter Trading and U.S. Exports

Recently barter trading, or countertrade, has increased in importance for developing nations and centrally planned economies. It's growing importance was recognized in the U.S. Food Security Act of 1985, which includes a strong encouragement from Congress for the U.S. to become involved in barter trading for strategic raw materials. The act authorizes barter trading with CCC-owned U.S. agricultural commodities and instructs the Secretary of Agriculture to provide technical assistance in such trading for U.S. exporters who request it.[50]

A lack of foreign exchange in developing nations and inadequate financing to obtain needed imports through more usual marketing methods often are motivations behind barter trading. Barter trading may include exchange of goods and/or services from one country for goods and services of another. In other variations, it can include pre-agreed counterpurchases from the trading partner or bilateral clearing accounts.[51] Some observers express concern that this process bypasses normal market mechanisms. In bypassing those mechanisms, it may avoid realistic price determination on products being traded and may insulate exporters from consumer quality demands that normally would be communicated through market channels. As a result, prices in barter trading may be artificially high, quality of goods may be low, and dumping of products into developed countries at prices below original production and marketing costs may occur.

The U.S. barter trade in farm products never has been large, even though the practice was used by the U.S. as early as the 1950s. Because of its weaknesses, it is unlikely to become a major outlet for the nation's agricultural exports. Despite its limitations, barter trade can be advantageous for some countries, and in some cases it could be a tool to facilitate economic growth and later development of more conventional markets for farm products.

# Longer-Term Trade Prospects Improve

With dramatic changes in U.S. agricultural policy that have been in effect since mid-1986, a key question for both the production agriculture and agribusiness sectors is: Will the lower farm price support levels maintain the recent recovery in the U.S. share of world agriculture trade and encourage expanded U.S. exports in the next few years? To answer this question, a research group at Iowa State University and the University of Missouri developed econometric forecasts of U.S. and world trade in major agricultural commodities to 1995-96.[52] These forecasts are based on the assumptions of no major weather disasters or political upheavals, no major business recession, and no major alterations of U.S. agricultural policies from those prescribed by the U.S. Food Security Act of 1985.

According to the forecasts, recent trends in world agriculture will continue and consumption of major grains gradually will increase into the late 1990s. Area planted to grains is expected to remain nearly constant in most major grain exporting nations, with the exception of a moderate increase in the U.S. in the last part of the period as government land-idling incentives are reduced. Yields both in U.S. and non-U.S. producing areas are forecast to increase modestly through the late-1990s and to meet the anticipated growth in world consumption. India is projected to remain a small net importer of wheat after a brief period of being a net exporter from 1985 through mid-1988. Chinese wheat imports are projected to remain in the 11 to 14 million ton per year range, with growing domestic demand absorbing all expected increases in Chinese production. Soviet feed grain imports are projected to remain in the 15 to 17 million ton range, modestly below the 1988-89 level, as its grain production fails to exceed growing domestic demand. The EC coarse grain exports are expected to stabilize at around three to four million tons, down about four million tons from the 1988-89 level.

After substantial growth in U.S. wheat and coarse grain exports in the past three years, U.S. wheat exports are forecast to decline slightly in the early 1990s before rising again in the 1993-96 period. The expected decline in U.S. exports in the next few years is due partially to an anticipated recovery of foreign crops from recent major weather problems. Average U.S. coarse grain exports for 1995-96 are projected to be about 42 percent above the 1987-88 level and slightly above the 1979-80 record of 71 million metric tons. Average U.S. wheat exports in 1995-96 are projected to be about 7 percent below the record level of 48.2 million metric tons reached in 1981-82. Soybean exports from the U.S. are projected to decline moderately because of expanded oilseed production in Western Europe, South America, and other areas. Growth in grain exports, increased U.S. domestic processing and grain feeding, and government incentives to reduce crop plantings are forecast to hold U.S. carryover stocks of coarse grains and wheat throughout the period at about one-third of the peak 1986-87 level. However, U.S. soybean carryover stocks are projected to increase in the early 1990s and stabilize through 1993-96.

Corn prices received by farmers are forecast to decline moderately in 1989-90 from drought-increased levels of the previous year, and stabilize at the lower level into the late 1990s. The average price received by U.S. farmers for corn is projected to range from $1.99 to $2.20 per bushel ($78.36 to $86.63 per metric ton) from 1989-90 through 1995-96. Nominal prices at that level would be about 14 to 22 percent lower than in 1988-89. Wheat prices follow a pattern similar to that of corn, with a $3.01 to $3.63 average farm price per bushel ($110.62 to $133.40 per metric ton) from 1989-90 through 1995-96. Prices in this range would be 2 to 19 percent below 1988-89 average farm prices. Cotton carryover stocks are expected to trend modestly downward during the forecast period, with 1993-96 average U.S. stocks about half as large as in 1988-89. Prices for soybeans and cotton are forecast to trend slightly upward in the 1990s. U.S. exports of beef are projected to trend upward into the late 1990s, but at a considerably slower rate than in the 1987-89 period. On the other hand, U.S. pork exports are projected to stabilize in the 1990s after a modest decline in 1989. U.S. exports of broilers are projected to remain constant in the 1990s.

These forecasts of U.S. and world exports of major farm products are summarized in Table 20. In general, they indicate a gradual diminishing of excess production capacity in U.S. agriculture into the late 1990s. The excess capacity will be restrained until that time by the long-term land-idling program specified in the Food Security Act of 1985. At the same time, total costs of U.S. farm income support and export subsidy programs are expected to decline modestly. Part of the cost of balancing global production and utilization is being transferred to other nations through lower U.S. price support levels and a greatly reduced willingness of the U.S. to support world crop prices. These costs are occurring in the form of increased farm program costs in the EC and other nations protecting domestic agriculture from import competition, and restrained farm incomes and asset values in areas such as Canada, Australia, and parts of Latin America where government farm income support programs traditionally have been limited. These costs also will reduce incentives to increase food self-sufficiency in developing nations that have chronic food shortages. Consumers in industrialized nations that use import barriers will see higher domestic food costs relative to food costs in the world market.

These forecasts outline the general path of the U.S. agricultural sector and world trade patterns that can be expected with no major external shocks and a continuation of recent U.S. agricultural policies. At this writing (late-1989), there is broad-based support to continue recent U.S. policies, with minor modifications to deal with special problems relating to crops such as oats and soybeans. U.S. agricultural policies have been an important factor behind a downward trend in area of these crops grown in the U.S. and a resulting loss of U.S. shares of global trade. Measures to deal with these aspects of U.S. agriculture could include adjustments in relationships of target prices among crops, and introduction on farm program features that provide greater flexibility to producers in allocating crop land among various crops.[53]

Along with agricultural policy variables, weather patterns will exert a strong influence on future production, utilization, exports and carryover stocks of major U.S. farm commodities. Historically, the long-term upward trend in U.S. crop yields and supplies of major crops generally has been interrupted by widespread weather problems during one to three years each decade. The timing and intensity of such problems usually are considered random events. Those problems can temporarily deflect the agricultural sector from its longer-term path. Therefore, weather variations may cause temporary deviations from the general long-term pattern of the U.S. agricultural economy forecast here. Widespread and severe weather problems in the U.S. coupled with the current low U.S. and global carryover stocks would be likely to trigger a substantial short-term decline in

**Table 20. U.S. and Major Exporter Net Export Forecasts for Wheat, Coarse Grains, Soybeans, and Soybean Meal in 1990-91 and 1995-96, and Comparisons with 1987-88 in Millions of Metric Tons.**

| Commodity | Prelim. 1987-88 | Forecast 1990-91 | Forecast 1995-96 |
|---|---|---|---|
| Major exporter wheat | 94.9 | 89.79 | 101.91 |
| U.S. wheat | 42.88 | 36.02 | 45.43 |
| Non-U.S. wheat | 52.02 | 53.77 | 56.48 |
| U.S., percent of total | 45 | 40 | 45 |
| Major exporter coarse grains | 73.67 | 80.71 | 99.44 |
| U.S. coarse grains | 51.42 | 56.55 | 72.88 |
| Non-U.S. coarse grains | 22.25 | 24.16 | 26.55 |
| U.S., percent of total | 70 | 70 | 73 |
| Major exporter soybeans | 28.37 | 24.34 | 26.96 |
| U.S. soybeans | 21.83 | 16.28 | 18.74 |
| Non-U.S. soybeans | 6.54 | 8.05 | 8.22 |
| U.S., percent of total | 77 | 67 | 70 |
| Major exporter soybean meal | 22.20 | 22.43 | 26.78 |
| U.S. soybean meal | 6.23 | 5.35 | 8.62 |
| Non-U.S. soybean meal | 15.97 | 17.08 | 18.17 |
| U.S., percent of total | 28 | 24 | 32 |

Sources: Forecasts are from FAPRI *Long-term International Agricultural Outlook*, Food and Agricultural Policy Research Institute, Iowa State University (Ames, Iowa), and University of Missouri (Columbia, Mo.), September 1989.

U.S. exports from the levels shown here. Under such conditions, the decline could be significantly larger than the U.S. has experienced in previous drought years.

Researchers disagree on the randomness or regularity of weather patterns in major world grain producing areas. However, one analysis of North American weather patterns has identified evidence of a long-standing drought cycle affecting the U.S. grain belt at approximately 18.6 year intervals. This research indicates a period of adverse U.S. weather is possible in the early 1990s.[4] The increased vulnerability of U.S. exports to major weather problems may lead to a reappraisal of U.S. grain inventory policies in 1990 farm legislation. Policies that may be re-evaluated include: the minimum size of needed reserve stocks, mechanisms for acquiring U.S. government grain inventories, and procedures for releasing those stocks into market channels when commercially owned supplies decline sharply.

# GATT Negotiations Continue Slow Progress

The eighth round of the General Agreement on Tariffs and Trade (GATT) Multilateral Trade Negotiations (MTN) began with an early 1987 meeting in Uruguay. The negotiations are expected to require another 12 to 14 months for completion. At this writing, 97 nations are participating in the negotiations.[56] Previous GATT negotiations focused more on nonagricultural trade issues. But widespread concern about protectionism, increased subsidies in agricultural trade, and depressed farm incomes prompted participating nations to move agricultural trade issues to the forefront. These negotiations are an effort by major industrial and agricultural exporting and importing nations to agree to reduce import restrictions and subsidies on exports of raw and processed farm products. If successful, the outcome will have important implications for agricultural producers, consumers, and policy makers throughout the world.

### GATT and Its Origins[54]

GATT originated during a series of meetings in 1946 and 1947 at which the International Monetary Fund (IMF) and a fixed system of currency exchange rates were established after World War II. At that time the U.S. proposed three organizations for dealing with international financing and trade problems: the IMF, the World Bank, and the International Trade Organization. The proposed International Trade Organization would have been assigned the tasks of promoting trade liberalization and enforcing trade policy agreements. The first two organizations were approved, but the U.S. Congress vetoed the International Trade Organization because it was unwilling to transfer domestic policy-making power to an international organization. In its place, GATT was established to encourage trade liberalization. However, GATT was not given enforcement powers. GATT is a set of trading rights and obligations voluntarily agreed to by a group of member nations. To compensate for the absence of enforcement powers, other member nations have the ability to withdraw concessions from a GATT member that has violated trading rules.[57] GATT specifies rules and guidelines for international trade, provides a forum for discussion of trade problems, and includes provisions for formally challenging other members' trading practices and policies. The importance of these procedures to agriculture is illustrated by the fact that over half of the cases of trade practices being challenged by the U.S. in late 1985 involved agricultural products, with most relating to the EC, Japan, and Canada.[58]

The U.S. had a major influence in the origin and the development of the purposes for GATT. From the start, GATT rules provided special treatment for agricultural imports and exports. For example, GATT provisions include four articles dealing with quantitative restrictions on imports of agricultural products. Article XI prohibits the use of quotas (with certain exceptions) Article XII provides an exception in the use of quotas for balance of payment reasons. Article XIII outlines rules where other exceptions are applied and quotas may be used. Article XIV provides additional exceptions to Article XIII in cases of certain balance of payment situations.[59] In Article XVI 1 of original GATT rules, subsidies on exports were permitted, but nations were required to report them. In 1955, rules were modified to prohibit nations from using subsidies on primary products to obtain more than an equitable share of world trade in the product or products in question. Regulations at that time were extended to prohibit subsidies on nonprimary product exports, thus bringing a distinction between farm and nonfarm products. Unsuccessful efforts to clarify these regulations were made during the 1979 Tokyo Round of GATT negotiations.[60]

Because of its prominence as an agricultural producer and its strong post-war political position, in 1955 the U.S. was able to obtain a waiver of GATT regulations. The waiver allowed the U.S. to impose quantitative restrictions on agricultural imports under Section 22 of the U.S. Agricultural Adjustment Act.[61] The Section 22 waiver permits the U.S. to implement import quotas if imports into the U.S. threaten its ability to manage certain domestic commodity programs. U.S. efforts also were a major factor in obtaining rules that excluded agriculture from prohibitions on export subsidies. When these exceptions were obtained, they were contrary to the purposes of GATT but did not cause major concern in a world where agricultural trade was much smaller than it is today and where only a few net agricultural exporting nations existed.

World agricultural trade in farm products has changed dramatically since the post-war decade and these special exclusions are now causing problems for the U.S. and many of its trading partners. In the late 1940s and 1950s, U.S. agriculture was much less dependent than now on exports as a source of income and a means of utilizing its production capacity. Few other major agricultural exporters existed, so resistance to allowing agricultural export subsidies and U.S. import quotas was limited. Concerns about these provisions also were relatively minor during the 1970s, because world import demand for farm products was growing rapidly and several nations shifted from a net export to a net import position.

But, the 1980s brought large agricultural surpluses, relatively low world prices, recent shifts of several nations from grain importers to exporters, an agricultural trade subsidy war between the U.S. and the EC, and growing protectionism. These developments indicate a strong need to reconsider GATT regulations relating to agriculture. A multinational approach may be needed to bring an end to the current trade subsidy war and other trade tensions. If one participant attempted to halt the subsidy war unilaterally, that nation would face a high risk that its export market share would decline sharply as competing countries keep their subsidies in place.[62]

The broad objectives of the 1987 Uruguay round of GATT negotiations are: (1) to improve market access through reduced import barriers, (2) to increase discipline in the use of trade subsidies, and reduce their adverse effects, and (3) to deal with the underlying causes of trade subsidies.[63]

### Requirement for Effective GATT Negotiations

Protection of domestic agricultural sectors is a major factor in current international trade policy issues. For example, the EC protects its grain producers with a complex system of price supports that in some cases holds domestic prices sharply above the world market price and includes large variable imports levies or duties that discourage imports.[64] A major objective of EC farm policy has been to provide self-sufficiency in farm products, and to avoid a repeat of major food shortages that occurred during and immediately after World War II. That objective has been attained, and the EC is now one of the world's largest agricultural exporters. Its policy objectives also included efforts to maintain a large number of relatively small farms.

The U.S. has highly protective policies relating to its sugar and dairy industries, including import controls and support prices that are well above world market prices. Recent GATT rulings declared that U.S. sugar policies violate that organization's rules. The U.S. also has a system of deficiency payments to protect crop pro-

ducers if world prices fall below specific target prices.[65] These crop payments are different than domestic price support systems in other nations, because U.S. producers are required to idle a significant part of their cropland to qualify for the price supports. In addition, the U.S. subsidizes alcohol fuels industry through motor fuel tax exemptions for alcohol fuels. In a sense, these tax exemptions protect the industry and subsidize exports of by-product feeds produced in the manufacturing of alcohol fuels.[66]

Brazil and Argentina tax exports of processed soybean products differently than exports of raw soybeans to encourage domestic processing of soybeans and export of value-added crops. EC policies also are designed to favor imports of oilseeds for processing over imports of processed products. EC policies encourage domestic oilseed production by supporting prices at levels well above world market prices. Japan allows no imports of rice and has very high support prices for domestically produced rice and other grains to ensure a minimal level of food self-sufficiency. The Japanese consider a minimal level of production essential for national security in a nation already heavily dependent on foreign food supplies and with a very limited domestic cropland base. Japan also has quotas on meat imports, quotas on imports of corn for industrial processing, and restrictions preventing livestock and poultry producers from buying unprocessed imported corn or sorghum and grinding and mixing it with other feed ingredients on their farms.[67] However, Japan has agreed to reduce and eventually eliminate quotas on beef and certain other agricultural imports.

These are only a few examples of major restrictions on agricultural trade that exist around the world. For the GATT negotiations to be fully effective in liberalizing agricultural trade policies, major participating nations will need to negotiate their domestic farm policies in an international setting. To accomplish the stated goals of GATT, legislative bodies of individual countries will need to provide bargainers with authority for such negotiation.[68] Domestic policies of the U.S., the EC, Japan, and other nations stem from unique social, cultural, historical, geographic, and economic conditions, and national values. Because of these factors, the U.S. Congress is not likely to delegate authority to completely negotiate away the U.S. target price system for grains or the basic system of sugar and dairy import restrictions and price support programs. For similar reasons, the EC is not likely to provide authority to completely negotiate away its variable levy pricing system on grain imports. It also is doubtful that Japan would provide authority to negotiate away all rice import restrictions, greatly reducing its self-sufficiency in what historically has been its most basic food. That would increase its vulnerability to food trade disruptions resulting from war, labor strikes, political embargoes, or other unpredictable events.

### GATT Positions[69]

Three main GATT negotiating positions have emerged; those of (1) the U.S., (2) the Cairns group, and (3) Japan-EC. The U.S. position was put forth in mid-1987 as key issues and areas of concern were being developed. It calls for a gradual elimination of all trade-distorting agricultural subsidies globally. The target date for complete elimination of subsidies and other practices that affect trade in farm products is the year 2,000.[70] Numerous groups and analysts view full attainment of this position as an unrealistic goal because it would require many nations including the U.S., to conform their agricultural goals and values to those of other nations. However, support in the U.S. for major changes in world trading rules is broad-based and bipartisan. That support was evident in the passage of the 1985 Food Security Act and a major 1988 U.S. trade bill. Direct and indirect costs to the U.S. under current global trading practices were important considerations behind both bills. The economic climate of world agriculture today has changed and that is having an impact on current GATT negotiations. Agriculture is becoming increasingly internationalized and dependent on world financial conditions. Restrictive agricultural trade policies have a high cost in many industrialized nations through direct government expenditures and/or added costs to consumers in purchasing agricultural products. As a result, the present economic environment may make major reductions in global agricultural subsidies a more realistic goal than in the past, although very major obstacles remain.

One observer notes that "losers" in global elimination of agricultural subsidies would include nearly all agricultural producers in Japan and the EC, as well as groups of highly protected producers in the U.S. and other nations. Potential gainers would include consumers and taxpayers in Japan, the EC, and the U.S., and low-cost producers in countries such as Argentina, Australia, Canada, and parts of the U.S.[71] Other gainers would include consumers and taxpayers in major importing countries. Producers in those nations would tend to be losers. This partial listing identifies several politically powerful groups that are likely to strongly oppose complete elimination of agricultural subsidies.

In their negotiating position, the EC and Japan maintain that complete elimination of government subsidies for agriculture is an unrealistic goal. They also note that the goal is not applied to other industries. Proponents of this position believe elimination of subsidies would cause severe market disruptions, but that some reduction in subsidies, trade barriers, and other forms of market distortion is appropriate. The EC position includes considerable emphasis on the maintaining of proportional shares of world trade. The EC also has put forth a "rebalancing" concept, in which reduced import restrictions on some commodities might be partially offset by increased import restrictions on others. In the EC, application of this concept might reduce impediments to grain imports, but increase import restrictions for oilseeds and grain substitutes. Japan insists that individual countries be permitted to subsidize their producers to ensure food security. The EC and Japanese viewpoints stem from internal food shortages a few decades ago and different societal values relating to the structure of agriculture than those generally held in the U.S.

The Cairns group consists of 14 major agricultural exporting nations that have been affected adversely by the U.S.-EC export subsidy war. It includes Australia, Argentina, Thailand, Brazil, and several other developing countries. This group traditionally provides little or no subsidies to the majority of its agricultural producers. For several major products, its producers also are in the "low-cost" category and could benefit from fewer restrictions on global trade. This group's position is similar to that of the U.S. It favors removal of import barriers and export subsidies and other agricultural support programs that affect trade. Agricultural research and extension programs and income support payments not linked to production would be permitted under its proposal.

The remaining third-world nations also have an important stake in the GATT negotiations. This group has not had a well-

organized position in the negotiations. It has a wide variety of concerns ranging from access to export markets, to protection of infant agricultural processing industries. The nations also want to encourage growth of domestic agricultural production to increase food security, strengthen local economies, increase the availability of raw materials for processing and export, and provide adequate food supplies for consumers at affordable prices. This group may feel developing nations that are heavily dependent on agriculture should be given certain trade concessions not available to more economically developed countries.

With these complex and different national backgrounds, difficult negotiations should be expected in the remainder of the Uruguay round. Although a four-year timetable was established at the initial meeting in early 1987, some analysts expect a longer negotiation period because previous GATT rounds have lasted much longer.[72] Immediate major restructuring of domestic farm policies of the U.S., Japan, the EC, and other nations probably should not be expected to result from the negotiations. But, a gradual multilateral easing of import restrictions and a gradual reduction in use of export subsidies seems likely. Grain exporting nations such as Australia, Canada, and Argentina, which have remained outside the U.S.-EC export subsidy war, will be interested in negotiating limits on export subsidies and time schedules for their elimination. Otherwise, nations not currently using trade subsidies could face unpleasant choices of accepting reduced export shares and continued restraints on incomes of their agricultural sectors, joining the subsidy war, or providing large direct government income transfers to soften the impact on their farm sectors. Although GATT negotiations will remain difficult and controversial, progress in dealing with current trade-related policy issues is anticipated. The Uraguay round or negotiations may impose some constraints on U.S. agricultural policy, with possible costs to sugar and dairy sectors, and benefits for producers and handlers of grains, oilseeds, and other crops.

# The U.S.-Canadian Free Trade Agreement[73]

On January 2, 1988, the President of the United States signed an agreement negotiated by representatives of the U.S. and Canada that is intended to reduce trade barriers between the two countries within 10 years. The U.S. and Canada are the world's two largest trading partners. This agreement provides a model for GATT negotiations and an illustration of the potential complexities in negotiations involving a large number of countries. The U.S.-Canadian agreement was approved by the U.S. Congress and the Canadian Parliament, and became effective on January 1, 1989. Over the next several years it may have particularly important implications for U.S. and Canadian producers of fruits, vegetables, wheat, pork, and, at times, possibly oilseeds, as well as nonagricultural products.

The agreement calls for the elimination of most tariffs and some non-tariff barriers to agricultural and nonagricultural trade between the two countries by the year 2,000. The economies of the U.S. and Canada are closely linked by trade flows and through U.S. corporate investments in Canada and dependence of Canadian corporations on U.S. financial markets. The U.S. buys more than three-fourths of Canada's total exports. Canada is a much smaller market for U.S. exports. Canada imports about $2.7 billion of U.S. agricultural products annually. The U.S. imports about $2 billion of Canadian agricultural products. Both figures are given in U.S. dollars. Horticultural products make up nearly half of Canada's agricultural imports from the U.S., largely because Canada's northern latitude and limited growing season restrict production of such products. The agreement may improve U.S. fruit and vegetable producers' access to Canadian markets, and substantially increase competition in Canadian markets for these products. Effects on other major agricultural products are expected to be smaller.

Key provisions of the agreement include: (1) elimination of all agricultural tariffs within 10 years; (2) a temporary "snap back" duty on fresh fruits and vegetables for both countries for 20 years if domestic prices drop below the average monthly import price of the preceding five years, excluding the highest and lowest years, and provided domestic planted acreage of the commodity in question does not exceed the previous five-year average, excluding high and low years; (3) elimination of U.S. quantity restrictions on imports of Canadian products containing 10 percent or less sugar by dry weight; (4) elimination of Canadian import licenses for U.S. small grains and grain products as soon as support levels in the two countries are equalized; (5) elimination of Canadian transportation subsidies on products moving through West Coast ports to the U.S.; (6) increases in global Canadian import quotas for poultry and poultry products to the annual average of actual shipments during the last five-years; (7) exemption from each other's meat import laws; and (8) agreement not to use direct export subsidies on agricultural products shipped to each other.

The "snap back" duty on fresh fruit and vegetable imports must not exceed the most favored nation duty. It can be applied only once in any 12-month period for a maximum of 180 days at a time. The duty is to be removed immediately if the import price of the commodity exceeds 90 percent of the five-year average price for five consecutive working days. This provision reflects the vulnerability of the Canadian fruit and vegetable industry to competition from U.S. imports. To protect the U.S. fruit and vegetable industry, the agreement also contains a provision requiring that products from a third country exported to Canada and then re-exported to the U.S. must be substantially transformed before being re-exported under the reduced tariffs of the agreement. Other details include provisions for greater access of U.S. alcoholic beverages to the Canadian market.

The U.S. is a small importer of Canadian grains, vegetable oil, soybeans, and soybean meal, despite small or modest tariffs on some of these products. For example, the U.S. has tariffs of: 5 percent on feed wheat imports from Canada, 5.7 percent on food wheat, 1.5 percent on barley, 7.5 percent on edible rapeseed oil, 2.7 percent on rapeseed meal, 5.4 percent on soybean meal, and 1.7 percent on corn. Canada's additional countervailing duty on imports of U.S. corn will not be removed immediately by the agreement. The U.S. has no tariff on soybean imports, but applies a 22.5 percent tariff on soybean oil imports, an 8.2 percent duty on live hog imports, a 2.6 percent tariff on beef and veal imports, and a 9.8 percent duty on butter imports. The U.S. countervailing duty on live hog imports will not be removed by the agreement and the agreement does not provide measures for liberalizing dairy trade between the two countries.[74]

The scheduled reductions and eliminations of tariffs could bring an increase in Canadian product imports into the U.S. as the agreement is implemented, particularly if the Canadian currency remains weak relative to the U.S. dollar. But, increases in imports of most products are expected to be small. At the same time, increases in U.S. exports of wheat, barley, and grain products to Canada are possible with that country's removal of import licensing requirements. Increased Canadian imports of U.S. fruits and vegetables are likely in the next few years, as a result of the agreement.

The agreement also provides for easing of nontariff barriers to U.S. Canadian trade. Included in this category, in addition to import licensing, are packaging and labeling requirements, bilingual labeling, health and sanitary regulations, grading requirements, Canadian limitations on consignment selling of fresh fruits and vegetables from the U.S., and related restrictions.

While the net impact on each country is not entirely clear, the Canadian nonagricultural economy may gain increased access to the large U.S. market. Improved access to U.S. outlets for its products may be particularly important, in view of growing foreign competition. But, there is concern in Canada that the agreement may make Canadian industries more subject to dominance by U.S. corporate interests. U.S. commodities most likely to benefit are fruits, and vegetables, wine, poultry, some grains and grain products, and beef. At times, the U.S. pork, durum wheat, and vegetable oil industries may suffer from the agreement.

# Linkages of U.S. Agriculture to Global Trade Policies

The financial condition of U.S. agriculture and related economic sectors is continuing to improve moderately from the severe deterioration of the mid-1980s, due partially to a sharp increase in the physical volume of agricultural exports, large government payments to producers resulting from 1985 agricultural legislation, and 1988 emergency drought-relief legislation. Financial stress in American agriculture and agribusiness in the last few years was evident from an unusually high percentage of U.S. farmers forced out of agriculture through bankruptcy or other means, excess capacity in the U.S. agricultural marketing and transportation system that was as high as 25 to 35 percent, severe financial losses and consolidation of firms and operations in the U.S. farm machinery industry, failure of the largest number of U.S. agricultural banks since the 1930s, and a sharp decline in asset values in U.S. agriculture and agribusiness. After experiencing these stresses, financial conditions of the U.S. agricultural sector improved significantly. However, problems remain in parts of the Farm Credit System and among some individual producers and agribusiness firms.

These problems also have been faced by farmers in several other nations. But, until very recently, such problems may have been more serious in the U.S. than elsewhere for at least three reasons. First is the traditional role of U.S. farm policy as the adjustment mechanism for balancing world supply and demand. Most other exporting nations do not have a policy of building large carryover stocks when world supplies exceed demand. Instead, their agricultural sectors move excess production into world markets and maintain carryover stocks near normal levels. Longstanding U.S. policies result in much of the world's excess grain production being held in U.S. carryover stocks in years of surplus crops.[75] Thus, when foreign grain supplies are large relative to demand, U.S. exports decline as other nations market their excess production. That makes the U.S. a residual supplier, and its carryover stocks rise when world production is large. Second, this process was accelerated from 1980 to 1985 by the strength of the American dollar, which placed U.S. farm product exports at a competitive disadvantage relative to other exporters. Strength of the U.S. dollar, at several points, was great enough to permit imports of major U.S. farm products such as wheat, soybeans, soybean oil, oats, and pork into the U.S. despite sizable import duties. A strong U.S. dollar encouraged foreign nations to invest in their farm sectors to expand their agricultural production. It also enabled them to market those supplies more easily than would be possible with a weak dollar. While the dollar dropped sharply in value against several industrial nation currencies in the 1986-88 period, it turned strongly upward again in late 1988 and 1989 and has remained quite strong relative to currencies of several other grain exporters and developing nation importers throughout the 1980s. Agricultural investments made when the dollar was stronger have few alternative uses and will continue to be used for agricultural production even with lower farm product prices.

A third factor making U.S. agriculture extremely vulnerable to declines in export demand is its large excess production capacity. In the absence of government supply control programs, domestic demand would absorb only about two-fifths of the normal U.S. wheat production, one-half of the U.S. soybean crop, and two-thirds of the annual U.S. corn production. A healthy and growing export demand thus is critical for U.S. agriculture in utilizing its excess production capacity. Other sectors with a major stake in strong export markets include rural communities across the U.S. and workers and firms in the agricultural input, marketing, finance, and transportation sectors. Nearly one out of every five workers in the U.S. is employed in an agriculturaly related job.[76] With the increased physical volume of U.S. agricultural exports, financial conditions in the U.S. agricultural sector have improved but remain less favorable than during the 1970s. Negative impacts on U.S. production agriculture from the sharp decline in exports in the 1981-86 period were tempered by aggressive government land-idling programs and sharply increased direct income payments to U.S. farmers to compensate for lower prices and land being removed from production. However, demand for agricultural inputs and marketing services declined until mid-1987 as a result of the land-idling programs. Large-scale land-idling programs reduced local employment opportunities and demand for products and services of mainstreet businesses in rural communities. A major uncertainty in future financial prospects for U.S. agriculture is the fact that large costs of U.S. government farm programs and federal budget deficits are generating pressure to reduce farm program expenditures.

With the internationalization of agriculture, trade policies and export trends are vital to the U.S. agricultural sector. Because of its heavy dependence on exports, realistic domestic policies for U.S. agriculture cannot be formulated without recognizing their links to the export sector and the current export environment. With the important role of exports in the financial health of U.S. and world agriculture, there is a strong need for the U.S. and its trading partners to work toward policies that encourage increased agricultural trade.

# Exchange Rate Impacts on Agriculture

There is considerable evidence that U.S. agricultural exports and imports respond, with time lags, to changes in the exchange rate of the dollar relative to other currencies. For example, a U.S. Department of Agriculture analysis indicated $3 billion of the decline in U.S. farm product exports during 1981-82 could be attributed to strength of the dollar relative to foreign currencies. Corn exports alone declined almost 10 million metric tons (400 million bushels) in response to exchange-rate fluctuations. The authors also indicated a 20 percent trade-weighted, inflation-adjusted rise in the dollar over a two-year period would decrease combined U.S. exports of corn, wheat, and soybeans by 16 percent from levels that would otherwise exist. The analysis assumes that other market influences will remain unchanged.[77]

Responses to weakness in the dollar's exchange rate from 1986 through mid-1988 may involve longer lags, particularly since it followed an extended period of high prices and a relatively strong U.S. dollar. High grain and oilseed prices during the 1970s and the strengthening U.S. dollar in the early 1980s encouraged large investments in agriculture and farm input industries in many parts of the world. Investments included machinery, fertilizer and chemical production capacity, land clearing, drainage, irrigation, development of improved varieties, and related production-increasing activities. These investments will continue to be used in production for an extended period of time, even with the recent lower levels of dollar-denominated world grain prices.

Because of long-term exchange rate effects, it will be important for the U.S. and other industrial nations to give high priority to policy changes that will promote a reasonably stable and realistic exchange rate of the U.S. dollar. Instability of the U.S. dollar has its roots in U.S. monetary and fiscal policy, including the large but modestly shrinking U.S. budget deficit, with its resulting decrease in funds available for private U.S. borrowing and investment, and a large need for foreign capital in-flows.[78] The U.S. budget deficit has been partially financed by an inflow of foreign capital seeking to earn high U.S. real (inflation-adjusted) interest rates. The exchange rate of the dollar in this situation is influenced by potential large fluctuations in international capital flows with foreign investors' changing perceptions about stability and growth prospects for the U.S. economy. International capital flows also drain investment funds from other nations, reducing foreign economic growth rates and retarding growth of export demand in some traditionally large U.S. agricultural export markets such as Western Europe. High U.S. real interest rates stem from a restrictive U.S. monetary policy that has been used to attract foreign capital and offset inflationary pressures from deficit spending. While U.S. interest rates declined significantly from earlier peak levels, the U.S. inflation rate remains well below the levels of the 1970s, leaving U.S. real interest rates at historically high levels. In mid-1989, the U.S. still had relatively high real interest rates compared with those of Japan and some West European nations. If confidence in the U.S. dollar is weakened by other developments, higher domestic interest rates may be required to ration available loanable funds and attract the required foreign investment into the U.S. to finance the federal budget deficit.

Accelerated growth of the nation's money supply has been suggested as one way to finance the budget deficit. But, that almost certainly would increase U.S. and world inflationary pressures, with the accompanying dangers of a new round of inflation-induced U.S. private and developing-nation debt buildup and more serious adjustment problems in the future. Liberal growth of the U.S. money supply also would be likely to weaken the U.S. dollar, thus making it more difficult for the rest of the world to export to the U.S. and, in some cases, worsening debt-repayment problems of developing nations. In addition, with U.S. interest rates largely deregulated, renewed inflation likely would increase interest rates. The resulting interest cost on the outstanding U.S. government debt of approximately 2.9 trillion dollars would increase the annual budget deficits. Thus, it is unlikely that the U.S. budget deficit problem could be solved by rapid growth in the nation's money supply. An attempt to solve it in that manner would carry large risks of more serious adjustment problems in the future.

As an indication of the changing U.S. budget situation, the annual federal budget deficit in 1979 was approximately $28 billion. With a sharp reduction in U.S. federal income tax rates and continued large government spending, it reached $221 billion by fiscal 1986, declined to $150 billion in fiscal 1987, and is expected to be in the $140 to $160 billion range in fiscal 1989.

With growing concern that the U.S. budget deficit would continue at or near a $200 billion annual rate for the foreseeable future, the U.S. Congress in late 1985 passed the Gramm-Rudman-Hollings Balanced Budget and Emergency Deficit Reduction Act. This act provides for a series of increasingly large annual reductions in expenditures in most categories of the U.S. budget, including defense programs, but excluding social programs and long-term agricultural land-idling programs. Its original goal was to balance the U.S. budget in the early 1990s, although that appears unlikely to be achieved. If this act is implemented fully and continually in the next few years, it may permit a further decline in real U.S. interest rates and could help to stabilize or slightly weaken the exchange rate of the U.S. dollar against developing nations' and other grain exporters' currencies. If so, that would be one of several factors helping to maintain a more stable and gradual uptrend in U.S. agricultural exports.

Side benefits from dealing with the U.S. budget deficit are likely to include a decline in interest-related cost pressures on U.S. agriculture, and increased U.S. private investment to stimulate the nation's economy and improve its productivity. Lower real interest rates also would improve trade by easing interest cost burdens of developing nations and accelerating their economic growth rates. Dealing with exchange rates through monetary policy alone runs the risk of sharp and disruptive fluctuations in the value of the U.S. dollar. But, a more balanced U.S. fiscal and monetary policy approach is less likely to cause such reactions. With the far-reaching exchange rate impacts outlined here, U.S. general economic policy developments may be nearly as important to the future of U.S. agriculture as changes in farm price support programs.

# Trade Subsidies[79]

Trade subsidies can take several forms, including direct payments to producers and/or processors, price or commodity rebates to foreign buyers, subsidized financing terms, or outright donations of products or services to foreign importers. These subsidies typically are used to increase an exporting nation's share of global trade and/or reduce surplus domestic supplies while protecting incomes of its agricultural producers. The U.S. and other nations use such subsidies. During the past two decades trade negotiations between the U.S. and trading partners have been aimed at reducing export subsidies and other restraints to foreign trade. But in the last three and one-half years export subsidies by the U.S. and the EC have been quite large as each attempted to protect its agriculture from adverse developments in the world economy and to increase its respective share of world food trade. Current U.S. examples of such subsidies include deficiency payments to grain producers under the U.S. target price system (these payments also are a compensation to producers for idling a sizable part of their cropland base), PL-480 export programs, the Export Enhancement Program, and exports of by-product feed ingredients from the corn milling industry, which are influenced by motor fuel tax exemptions on alcohol fuels.

U.S. trade policy in 1988-89 was directed at the increasingly large grain export subsidies used by the EC to export its surplus agricultural production, and continuing large Japanese non-agricultural trade surpluses with the U.S. The U.S. share of global exports of several major agricultural commodities declined sharply from 1981 to 1986. In some instances, the EC share of those same commodity exports increased during the same period. As a reaction to its declining trade shares, the U.S. in mid-1985 implemented the Export Enhancement Program, which was initially targeted against the EC's subsidized wheat exports. The program was sharply expanded from 1986-87 through 1988-89, and was broadened to include exports of barley, vegetable oils, and sorghum. The program provides bonus quantities of commodities from U.S. government-owned grain or other farm product inventories when designated importers purchase commercial U.S. supplies. Its purpose is to make U.S. agricultural exports competitive with subsidized EC exports. Through mid-1989, this program had contributed strongly to increased U.S. wheat and barley export shares even though it had been met by expanded EC export subsidies. Recipient nations and areas under the program have included the Middle East, North Africa, Eastern Europe, the USSR, and China. Current U.S. agricultural legislation mandates that U.S. export subsidies are to be maintained at high levels for at least the next year.

Trade subsidies should be used with caution. Escalating U.S. and EC subsidies led to an agricultural trade war in the late 1980s. Each side progressively increased its subsidies and/or lowered its prices to increase its respective trade share, while both sides incurred progressively larger costs. The trade war at times has spilled over into nonagricultural products, with U.S. placing large import duties on certain industrial products from Canada, Brazil and Japan, and with the EC at times also threatening to protect its economy from such imports.

Large export subsidies of the U.S. and other major exporters have a strong negative impact on the agriculture of grain-importing developing nations and non-subsidizing exporting countries. Subsidies tend to depress prices in importing nations, weakening or removing the incentive for farmers in developing countries to expand production. In the long run, that could work to the disadvantage of consumers in lower-income developing countries by limiting their nations' ability to become self sufficient in food production. For nonsubsidizing exporters, the subsidies depress prices, reduce agricultural incomes and reduce trade shares from levels that would otherwise exist. With these potential secondary impacts, it is advisable to use trade subsidies with considerable caution. Such tools should not be expected to solve food trade problems arising from excessive indebtedness, slow global economic growth, overvalued currencies, and excess resources in the agricultural sectors of grain exporting nations.

# Biotechnology: Implications for Future World Agricultural Trade[80]

Recent scientific developments have made possible the transfer of genes and other processes in plant and animal breeding. Those developments may sharply increase future agricultural productivity. Because biotechnology is in its infancy, its full impact will not be known for at least one or two decades. Biotechnology encompasses a broad area including the development of plant and animal growth stimulants, biological control agents (for insects, weeds, diseases, etc.), improved plant and animal breeding techniques, transfer of favorable genes from one plant or animal to another, new processing techniques, and development of new crops and agricultural products. These developments eventually may have major impacts on global production and trade patterns as well as on the structure of production agriculture and agribusiness.

The most economically significant applications of biotechnology currently on the horizon are for livestock. Two developments in biotechnology that may have commercial application and trade impacts in livestock products in the early 1990s are: a naturally occurring hormone for cattle (bovine somatotropin or BST) that increases milk production per cow by 10 to 20 percent from levels occurring under current production programs; and a growth stimulant for swine (porcine somatotropin) that may increase feed conversion efficiency by one-fifth or more from levels typical in current feeding programs and also reduces the fat content of the meat. These developments could provide a major trade advantage to countries that permit their use and are early adopters. These two developments alone could have far reaching effects on U.S. and world agriculture if they are widely adopted.

### Livestock Biotechnology

The milk production hormone would sharply reduce the number of dairy cows (and dairy farmers) needed to meet market demand, would spread fixed costs of dairy production on individual farms over more units of milk output, and might significantly lower total production costs per unit. If used in some countries but not others, it could provide user nations with a major trade advantage. Impacts on grain, roughage, and protein meal consumption are unclear at this time. Accompanying management requirements for successful use may accelerate changes in the structure of dairy industries in user countries by increasing the cost advantage of larger farms that have the necessary specialized management personnel. The swine growth stimulant may sharply reduce grain requirements in the U.S. and world pork industries, while increasing protein meal requirements somewhat. Because the swine industry is one of the largest users of coarse grains, the stimulant would increase surplus grain production while reducing grain import needs of major importing nations that are adopters and users of the product. The stimulant also could modestly reduce global grain trade at some future time and increase oilseed meal trade. Other issues surrounding these two products of biotechnology relate to consumer acceptance.

Another currently available technology is the ability to transplant fertilized livestock eggs and embryo. Through this technique, offspring of genetically superior animals can be expanded in number much more rapidly than in the past. The process assists livestock breeders in developing animals with superior feed conversion efficiency, rates of gain, tendencies toward multiple births, desirable carcass qualities, and other beneficial features. In the next decade or two, this process may improve production efficiency in animal agriculture and reduce grain requirements per unit of meat output. The ability to transfer genes through biotechnology also may accelerate improved productivity of the livestock sector. Thus, it too could tend to restrain future growth in global grain trade.

### Crop Biotechnology

Potential productivity gains from applying biotechnology to crop production are largely unknown. Major economic impacts in this area may be 8 to 15 years in the future. Eventual improvements in crop productivity may come from breeding of grains, oilseeds, and other crops with greater tolerances to drought; transplanting nitrogen fixation ability from legumes to grains; development of commercially applicable hybrid soybeans; development of grains with greater resistance to cold, frost damage, insects, and lodging; development of crops with naturally occurring herbicide and insecticide qualities; and development of crops to more adequately meet quality needs of certain markets. These developments could substantially increase productivity per hectare, reduce total costs per unit, diminish the sensitivity of crop production to adverse weather and contribute to expanded use of certain crops. If these developments are accomplished, they also would increase global grain surpluses. That would challenge policy makers to develop incentives that would increase the availability of food for undernourished persons in developing nations and minimize pressures for predatory trade practices by grain exporters seeking a larger share of a slowly growing world market. While major biotechnology developments in grain may be several years away, progress is being made in the development of varieties with specific herbicide tolerances and resistance to certain insects.

Biotechnology developments that reduce the need for herbicides and insecticides would help allay growing U.S. and European concern about water pollution stemming from heavy use of agricultural chemicals in crop production. These developments also could reduce per unit costs of crop production, enlarging the world market for grains and oilseeds by making livestock-poultry-dairy diets more affordable to the developing world. If successful, such developments would create major growth opportunities in the plant breeding and seed industries, but are likely to create a need for major additional restructuring and disinvestment in the agricultural chemical industry and possibly in the nitrogen fertilizer industry.

### Development of New Uses for Farm Products

Biotechnology also may expand industrial markets for agricultural crops, although such developments are largely speculation at this time. In the last two decades, developments in biochemistry, chemical engineering, and grain processing have led to the creation of new corn sweeteners and alcohol fuel industries and new uses of corn starch in industrial applications. While these new industries have had a negative impact on U.S. and world sugar demand, the demand for corn increased moderately. Recent research also has created technically feasible uses for vegetable oils as a dust suppressant in grain elevators and for other industrial and agribusiness applications. As another example, research by the Agricultural Research Service of the U.S. Department of Agriculture created a biodegradable plastic produced partly from corn starch. The economics of commercial production are not yet clear, but use of the product for garbage bags and other containers may moderatly increase demand for U.S. corn.[81]

Future research may generate additional new uses for grain and oilseed crops as raw materials in industrial processes, and

could lead to the development of entirely new crops to meet specific industrial needs. With that possibility in mind, limited research is being conducted on industrial applications of new oilseeds not currently grown on a commercial scale. As with research in crop and livestock biotechnology, it will be important for policy makers and managers of farm input, production, and marketing firms to monitor new developments in this area. Creation of large new blocks of demand for farm products through research in processing methods and biochemistry is not anticipated in the near future, although significant developments in this field could occur in the early part of the twenty-first century.

Because of the newness of biotechnology, its full impacts are largely speculation at this time. Major developments in biotechnology may have profound impacts on global food trade, the structure of production agriculture, appropriate domestic and world trade policies, agribusiness firms, the competitiveness of U.S. agriculture in world markets, food security, and the ability of the world to meet the food needs of people in developing nations whose diets are below minimum nutritional standards. Present indications are that crop biotechnology will not have major impacts on world agriculture before the turn of the century. However, significant impacts in livestock production may occur during the next 5 to 10 years and may affect grain utilization and trade.

# Other Trade Policy Developments and Issues

### Dealing with Developing-Nation Debts

Third World debt problems are interrelated with factors causing the strong U.S. dollar relative to many developing-nation currencies, and are a contributor to slower growth in agricultural imports by developing countries in the mid- to late 1980s. Global policies for dealing with the exchange rate problem and high real U.S. interest rates may provide partial relief to heavily indebted nations. But, lower real interest rates alone will not fully resolve debt burdens. Many developing-nation loans are short term in nature. Lengthening repayment periods is important in helping those countries through current financial difficulties.[82] Other important tools include more restrained monetary and fiscal policies in developing nations, policy measures to improve productivity of the economies involved, partial debt forgiveness, and lender exchanging of debt for equity in the developing-nation industries. While the task is a difficult one requiring caution and a few more years of adjustment, the outcome is critical for the world economy. Widespread inability of developing countries to meet debt servicing commitments could endanger multinational lending institutions, risk serious disruption of the world monetary system, and slow world economic growth, or set the stage for a serious worldwide recession. Resolution of Third World debt problems will be important for agricultural exporting nations and for the physical well-being of people living in developing countries. These nations were one of the fastest growing import markets for farm products during the 1970s. With a shift to policies promoting economic stability and growth in the Third World, they may offer substantial growth in global demand for farm products in the years ahead.

### Trade Protectionism

In today's global economy, there are strong pressures for increased protection of domestic industries against foreign imports. For example, the EC threatened to restrict its imports of corn gluten feed and meal, oilseeds, and other U.S. farm products. In the U.S., Congress passed extensive trade legislation requiring retaliation against imports from nations that consistently run large trade deficits with the U.S. Other evidence of protectionism include the voluntary restraints on Japanese exports of automobiles into the U.S., developed after U.S. pressures for more direct actions. The U.S. also restricted imports of Canadian hogs, imposed a tariff on imports of Canadian cedar shingles, threatened to take action against imports from Brazil unless that nation liberalizes policies relating to imports of U.S. products, and strongly warned the EC against tightening its import restrictions.

These are only a few examples of a large list of recent and/or proposed protectionist trade policies. A Washington University study indicates these restrictions cost United States consumers about $58.5 billion annually in the form of hidden taxes, along with additional long-run costs through reduced incentives for innovation and improved productivity.[83] With unemployment problems in some countries, strong foreign competition, and domestic political pressures, many other trading nations also are facing strong pressure to protect domestic industries through trade restrictions. However, the lessons of the 1930s should be a reminder that sharply increased protectionism leads to declining trade and sluggish world economic activity.[84] Protectionist trade policies were a major contributor to the world economic depression of the 1930s and are an example of the dangers of increased trade protectionism. In establishing trade policy, policy makers should recognize that trade requires two-way exchange between nations. One nation's exports generate revenue that is used to purchase its trading partner's products. The U.S. agricultural sector and the U.S. economy thus have a very important stake in resisting current tendencies toward increased trade protectionism in the industrial sector that could affect foreign nations' ability to purchase U.S. products.

### Food Security

Food security is a critical and complex policy issue for much of the developing world and is being brought to the forefront by sharply reduced global grain and oilseed stocks that resulted from 1987 and 1988 droughts. One aspect of the problem is illustrated by estimates that the caloric intake of more than 800 million people, or 60 percent of the population of less developed nations, is below the minimum standards established by the United Nations Food and Agricultural Organization and the World Health Organization.[85] Furthermore, these estimates do not reflect quality dimensions of diets such as protein levels and other non-caloric nutritional requirements. The hunger problem is concentrated in Sub-Saharan Africa, parts of Latin America, and South Asia. Although food production increased in some African nations in the last two years, serious long-term problems and challenges in food production remain. Chronic food shortages continue in some parts of the continent.[86]

Another dimension of world food security is standards for grain carryover stocks. Some world food authorities place minimum stock levels for food security purposes at 17 to 18 percent of annual world utilization. Global carryover stocks in 1989 are estimated at 18 percent of annual utilization, just equal to the minimum standard.[87] But, the standard is only a general guideline. Geographic distribution of available stocks also is important from a food security standpoint. The location of stocks can determine whether a supply of grain is readily available to quickly meet emergency food shortages. Location also can affect prices paid to producers in exporting countries if stocks are concentrated in a few major exporting regions, as is currently the case. Thus, formulation of acceptable policies for adequate world grain stocks must include impacts on both surplus and deficit food producing nations.

A short-run aspect of food security is the ability to meet emergency food needs resulting from drought or other natural disasters. This includes the availability of supplies and the financing and distribution systems necessary to promptly and efficiently deliver the products where they are needed. Difficult issues yet to be resolved include the desired size and locations of reserve stocks, methods of sharing storage costs, methods of acquiring and releasing stocks to minimize disruptions in importer and exporter nations, and availability of financial and physical support services to quickly move supplies to needed locations. These issues are especially important for the people of Sub-Saharan Africa, the Indian subcontinent, and parts of Latin America where food shortages are a frequent occurrence.[88]

Long-run dimensions of food security include population trends, policies for increasing food production in food-deficit developing nations, and improved distribution systems. Global food production is sufficient to adequately meet the needs of the world's current population,[89] but uneven distribution of food reflects severe poverty in many areas. Lack of funds for food purchases and physical distribution problems are chronic long-term problems in the food situation of the world's poorest nations. Dealing effectively with these problems is a

major challenge for current and future generations. Its importance is highlighted by the fact that the Third World has been the flashpoint for East-West conflicts,[90] indicating that food security, poverty or economic well being, and world peace are closely interrelated.

### Policies Related to Value-Added Exports

Value-added exports benefit the exporting nation by enabling its population to gain both from employment in processing activities, and from an economic multiplier effect as expenditures in the processing sector are dispersed through its economy. The soybean industries in the EC and Brazil are examples of policies that encourage exports of value-added products. As noted in an earlier section of this report, the U.S. share of global processed soybean product exports dropped substantially from 1979-80 through 1988-89 while these two areas enjoyed a sharply rising share. Because the U.S. soybean processing industry has excess capacity, this issue appears likely to receive additional attention in the next few years. Brazil encourages exports of processed products rather than soybeans by differential export taxes, with a larger tax on soybean exports than on exports of soybean products, as well as by export quotas on soybeans; subsidized interest rates for processors; and duty-free imports of equipment used in production of export goods.[91] In the EC, a modest import tax is applied to soybean oil, thus favoring imports of soybeans for processing, rather than imports of meal and oil. The processing industries in these areas and the U.S. appear to be moving closer to a confrontation. As a result, this issue may be on the list of trade policy questions coming to the forefront in the early 1990s.

# Notes

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6. S. Mielke, "World Supply, Demand and Competition for Soybeans and Products in the Eighties and Nineties," *World Soybean Research Conference-III, Proceedings*, edited by R. Shibles, Westview Press (Boulder, Colo.), September 1985, pp. 51-62.

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11. U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agricultural Circular: World Livestock Situation*, FL&P 2-88 (Washington D.C.) October 1988, p. 4.

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17. U.S. Department of Agriculture, Economic Research Service, *World Agricultural Outlook and Situation Report*, WAS-39 (Washington, D.C.), March 1987.

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# Appendix I. Classification of Countries by Economic Category

**Appendix I. Classification of Countries by Economic Category.**

**Developed Market Economies**

Australia
Austria
Canada
Denmark
Finland
West Germany
France
Iceland
Ireland
Italy
Japan
Luxembourg and Belgium
The Netherlands
Norway
Sweden
Switzerland
United Kingdom
United States

**Rapidly and Moderately Developing Nations**

Algeria
Argentina
Bolivia
Brazil
Cameroon
Chile
Colombia
Congo
Costa Rica
Cyprus
Dominican Republic
Ecuador
Egypt
El Salvador
Ghana
Greece
Guatemala
Honduras
India
Indonesia
Iran
Iraq
Israel
Ivory Coast
Jamaica
Jordan
Korea (South)
Kuwait
Lebanon
Liberia
Libya
Malaysia
Mexico
Morocco
New Zealand
Nicaragua
Nigeria
Pakistan
Panama
Papua New Guinea
Paraguay
Peru
Philippines
Portugal
Puerto Rico
Saudi Arabia
Senegal
Singapore
South Africa
Spain
Syria
Taiwan
Thailand
Trinidad
Tunisia
Turkey
Uruguay
Venezuela
North Yemen
Zambia
Zimbabwe

**Centrally Planned Economies**

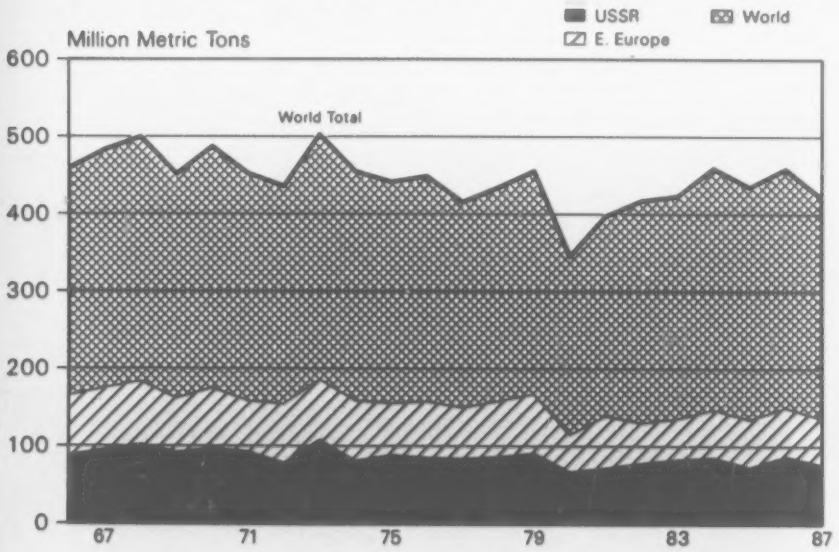
Albania
Angola
Bhutan
Bulgaria
China
Cuba
Czechoslovakia
East Germany
Hungary
Kampuchea (Cambodia)
Korea (North)
Laos
Mongolia
Mozambique
Poland
Romania
South Yemen
USSR
Vietnam
Yugoslavia

**Other Developing Nations**

Afghanistan
Bahamas
Bahrain
Bangladesh
Barbados
Benin
Botswana
Burma
Burundi
Canary Islands
Central African Republic
Chad
Comoros
Cape Verde
Dijibouti
Dominica
Ethiopia
Equatorial Guinea
Fiji
French Pacific Islands
French West Indies
Gabon
The Gambia
Grenada
Guinea
Buinea Bissau
Guyana
Haiti
Hong Kong
Kenya
Lee Wind Islands
Lesotho
Madagascar
Malawi
Maldives
Mali
Malta
Mauritania
Mauritius
Nepal
Netherland Antilles
Niger
Oman
Other West African
Qatar
Rwanda
St. Lucia
Sao Tome Principe
Seychelles
Sierra Leone
Solomon
Somalia
South Pacific Islands
Southwest African
Sri Lanka
Sudan
Surinam
Swaziland
Tahiti
Tanzania
Togo
Uganda
United Arab Emirates
Upper Volta
Western Samoa
Zaire

# Appendix II. Potato, Cassava, and Pulse Production by Major Producing Areas

**Appendix II, Figure 1. World Potato Production by Millions of Metric Tons by Major Producing Areas, 1966-87 Calendar Years.**




Source: Food and Agriculture Organization of the United Nations, *Production Yearbook* (Rome, Italy), various issues.

**Appendix II, Table 1. Cassava Production in Major Producing Nations from 1973 through 1987 in Millions of Metric Tons.**

| Area or Country | 1973 | 1979 | 1981 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|---|
| China | 2.0 | 2.5 | 3.5 | 3.7 | 3.5 | 3.4 |
| India | 6.4 | 6.1 | 5.9 | 5.7 | 4.9 | 3.6 |
| Indonesia | 11.2 | 13.8 | 13.3 | 14.1 | 13.3 | 13.7 |
| Philippines | 0.5 | 2.3 | 2.3 | 1.6 | 1.7 | 1.8 |
| Thailand | 5.7 | 11.1 | 17.7 | 19.3 | 15.3 | 19.6 |
| Others | 0.4 | 0.4 | 0.5 | 4.1 | 4.2 | 4.0 |
| Far East Total[a] | 26.1 | 36.1 | 43.2 | 48.5 | 42.9 | 46.1 |
| Ghana | 1.6 | 1.8 | 1.7 | 3.0 | 3.7 | 2.9 |
| Mozambique | 2.5 | 3.0 | 3.2 | 3.3 | 3.3 | 3.4 |
| Nigeria | 9.6 | 10.5 | 11.0 | 13.5 | 14.7 | 14.0 |
| Tanzania | 3.8 | 5.1 | 6.0 | 5.5 | 5.5 | 5.5 |
| Zaire | 11.0 | 12.0 | 13.2 | 15.5 | 15.6 | 16.1 |
| Others | 12.5 | 13.6 | 14.8 | 17.7 | 18.1 | 17.2 |
| Africa Total[a] | 41.0 | 46.0 | 49.8 | 58.5 | 60.9 | 59.1 |
| Brazil | 26.5 | 25.0 | 24.5 | 23.1 | 25.5 | 24.7 |
| Colombia | 2.0 | 1.9 | 2.2 | 1.4 | 1.3 | 1.4 |
| Others | 3.5 | 4.1 | 4.2 | 5.1 | 5.3 | 4.9 |
| Latin America Total[a] | 32.0 | 30.9 | 30.8 | 29.6 | 32.1 | 31.0 |
| World Total[a] | 101.3 | 117.6 | 128.0 | 137.0 | 137.0 | 137.3 |

Source: Food and Agriculture Organization (FAO) of the United Nations, (Rome, Italy), *Food Outlook*, No. 8, September 1986; and FAO *Production Yearbook*, Vols. 40 & 41, 1986, 1987.
[a]Totals may not add up due to rounding.

**Appendix II, Table 2. World Pulse Production in Major Producing Areas from 1973 through 1987 in Millions of Metric Tons.**

| Area or Country | 1973 | 1976 | 1978 | 1979 | 1980 | 1982 | 1983 | 1984 | 1986 | 1987 |
|---|---|---|---|---|---|---|---|---|---|---|
| Asia | 20.7 | 22.9 | 22.4 | 22.2 | 19.9 | 22.2 | 23.7 | 24.0 | 24.6 | 23.3 |
| Africa | 4.7 | 5.8 | 5.6 | 5.7 | 5.4 | 6.0 | 5.5 | 5.0 | 7.0 | 6.5 |
| C. America | 1.6 | 1.3 | 1.7 | 1.5 | 1.6 | 1.8 | 1.9 | 1.8 | 1.9 | 1.7 |
| S. America | 2.9 | 2.6 | 3.0 | 3.2 | 2.7 | 3.8 | 2.4 | 3.5 | 3.2 | 2.9 |
| N. America | 1.0 | 1.1 | 1.3 | 1.3 | 1.7 | 1.7 | 1.1 | 1.4 | 1.8 | 2.4 |
| W. Europe | 2.0 | 1.6 | 1.8 | 1.8 | 1.9 | 1.9 | 2.1 | 2.7 | 3.9 | 4.5 |
| E. Europe | 0.8 | 0.6 | 0.8 | 0.7 | 0.8 | 1.0 | 1.0 | 1.4 | 1.4 | 1.5 |
| USSR | 8.4 | 8.7 | 7.8 | 4.3 | 6.4 | 6.5 | 8.2 | 8.8 | 10.4 | 8.5 |
| Oceania | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.3 | 0.3 | 0.6 | 1.1 | 2.0 |
| World Total[a] | 42.2 | 44.8 | 44.5 | 40.9 | 40.6 | 45.2 | 46.2 | 49.1 | 55.2 | 53.3 |

Sources: Food and Agriculture Organization (FAO) of the United Nations (Rome, Italy), *Food Outlook*, 1983; Statistical Supplement, March 1984 and February 1987; and FAO *Production Yearbook*, Vols. 40 & 41, 1986, 1987.

[a]Totals may not add up due to rounding.

# Appendix III. Major Destinations of U.S. Soybean Exports in 1975-76 and 1987-88

**Appendix III, Table 1. Percentage Shares of U.S. Soybean Exports to Major Foreign Destinations in 1975-76 and 1987-88.**

| Region or Country | 1975-76 | 1987-88 |
|---|---|---|
| | Percentage | |
| Western Hemisphere | 3.7 | 10.2 |
| European Community | 60.0 | 41.7 |
| Other Western Europe | 1.5 | 0.9 |
| Eastern Europe | 1.5 | 2.7 |
| Israel | 2.7 | 2.4 |
| Japan | 21.6 | 20.4 |
| Taiwan | 5.2 | 9.9 |
| Others | 3.8 | 11.8 |

Sources: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, various issues.

# Appendix IV. Sources of U.S. Beef and Pork Imports in 1987-88

**Appendix IV, Table 1. Percentage Shares of Dollar Value of U.S. Beef and Veal Imports from Major Foreign Origins in 1987-88.**

| | 1987-88 Percentage |
|---|---|
| Canada | 7.1 |
| Central America | 5.8 |
| Brazil | 3.6 |
| Argentina | 7.2 |
| Australia | 45.6 |
| New Zealand | 27.5 |
| Others | 3.2 |

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Years 1987 & 1988 Supplement.

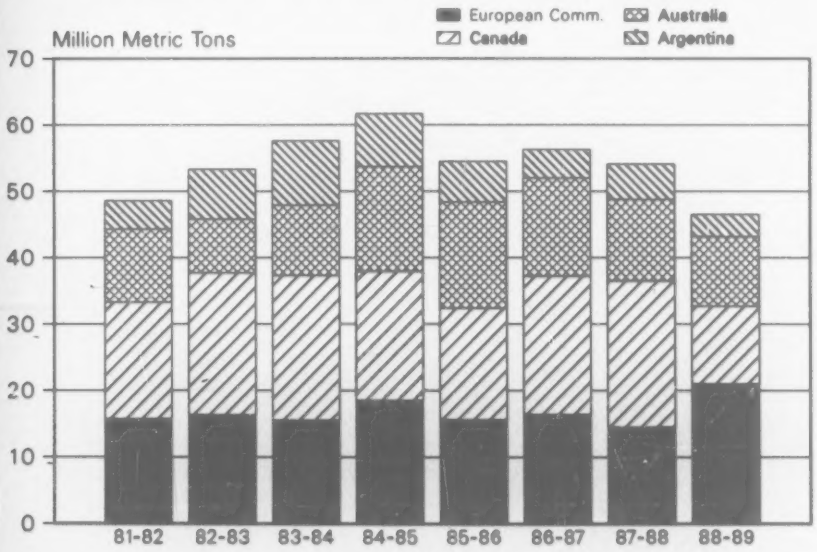
**Appendix IV, Table 2. Percentage Shares of Dollar Value of U.S. Pork Imports from Major Foreign Origins in 1987-88.**

| | 1987-88 Percentage |
|---|---|
| Canada | 41.1 |
| European Community | 38.5 |
| Eastern Europe | 19.9 |
| Others | 0.5 |

Source: U.S. Department of Agriculture, Economic Research Service, *Foreign Agricultural Trade of the United States*, Fiscal Years 1987 & 1988 Supplements.

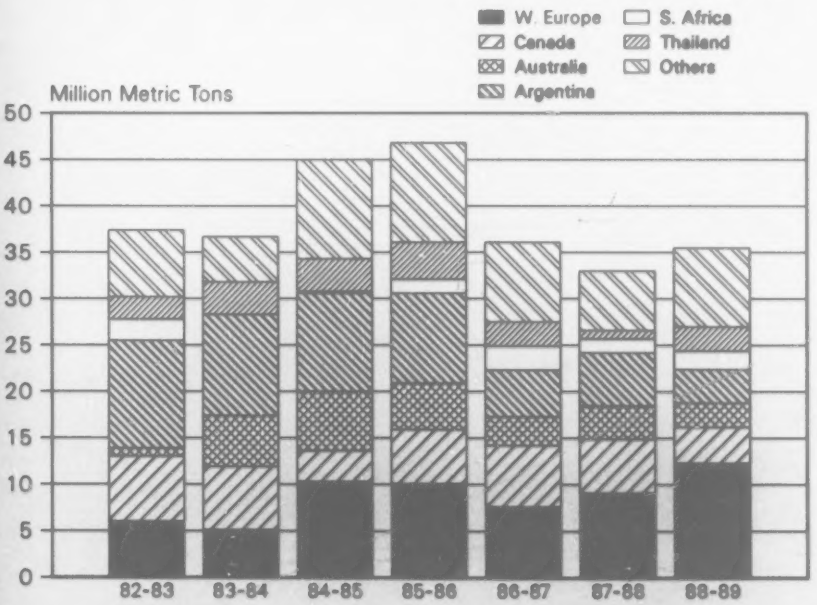
# Appendix V. Wheat and Course Grain Exports by Major Non-U.S. Exporters

**Appendix V, Figure 1. Wheat Exports by Major Non-U.S. Exporters, July-June 1988-89 and Comparisons with Recent Years in Millions of Metric Tons.***




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; FG 4-89, April 1989; various other issues.
*From 1982-83 on, the EC is EC-12.

**Appendix V, Figure 2. Coarse Grain Exports by Major Non-U.S. Exporters, October-September 1988-89 and Comparisons with Recent Years in Millions of Metric Tons.**




Source: U.S. Department of Agriculture, Foreign Agricultural Service, *Foreign Agriculture Circular: World Grain Situation and Outlook*, FG 3-88, March 1988; FG 4-89, April 1989; various other issues.

# Appendix VI. World Milk Production, 1968-1989, by Major Producing Regions

**Appendix VI, Table 1. World Milk Production, 1968-89, by Major Producing Areas in Millions of Metric Tons.**

| | Avg. 1968-72 | 1973 | 1976 | 1981 | 1983 | 1984 | 1986 | 1987 | Prelim. 1988 | Forecast 1989 |
|---|---|---|---|---|---|---|---|---|---|---|
| U.S. | 53.4 | 52.4 | 54.3 | 60.2 | 63.4 | 61.4 | 65.4 | 64.5 | 65.9 | 66.0 |
| EC-12 | 94.0 | 97.8 | 97.9 | 104.9 | 118.2 | 116.2 | 115.8 | 110.7 | 107.8 | 109.0 |
| USSR | 82.6 | 88.3 | 91.8 | 88.9 | 96.5 | 97.9 | 102.1 | 103.2 | 105.5 | 107.3 |
| Eastern Europe | 31.7 | 34.7 | 35.7 | 40.2 | 42.1 | 43.7 | 42.7 | 42.8 | 42.9 | 42.8 |
| India | 21.7 | 23.1 | 23.7 | 14.0 | 16.0 | 17.1 | 19.5 | 17.7 | 22.5 | 24.0 |
| Other Western Europe | 21.6 | 22.1 | 22.3 | 22.5 | 16.3 | 16.6 | 16.1 | 15.9 | 15.5 | 15.6 |
| Brazil | 7.3 | 7.2 | 8.5 | 10.5 | 10.7 | 10.8 | 9.8 | 11.0 | 13.2 | 13.3 |
| New Zealand | 6.2 | 6.0 | 5.7 | 6.7 | 6.9 | 7.6 | 8.2 | 7.3 | 7.9 | 7.5 |
| Australia | 7.3 | 7.3 | 7.0 | 5.3 | 5.7 | 6.1 | 6.2 | 6.3 | 6.3 | 6.4 |
| Canada | 8.2 | 7.7 | 7.6 | 8.0 | 7.9 | 8.1 | 7.9 | 8.0 | 8.2 | 8.3 |
| Total* | 334.1 | 346.6 | 354.5 | 361.2 | 383.5 | 385.5 | 393.7 | 387.4 | 395.7 | 400.2 |

Sources: U.S. Department of Agriculture, Foreign Agriculture Service. *Foreign Agriculture Circular: Dairy, Livestock and Poultry: U.S. Trade and Prospects*, FDLP 1-88, November 1988, FDLP 1-87, November 1987, FDLP 2-86, November 1986, FDLP 1-86, May 1986, FDLP 1-85, March 1985, FDLP 6-76, Decer, ber 1976.

*Total may not add up due to rounding.

# Appendix VII. Long-Term Trends in Wheat and Coarse Grain Production and Trade for Selected Regions and Nations

**Appendix VII, Table 1. Long-Term Trend in Grain Production for Selected Regions and Nations in Millions of Metric Tons.[a]**

| | 1895 | 1903 | 1913 | 1923 | 1933-34 | 1935-39 | 1955 | 1963 | 1973 | 1983 | 1986 | 1987[b] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 83[c] | 50 | 2.89 | 3.72 | 4.77[c] | 5.05 | 6.40 | 10.12 | 14.80 | 10.95 | 21.42 | 19.0 |
| Argentina | 3.46[c] | 6.61[c] | 10.19 | 14.03 | 14.82 | 14.20 | 11.54 | 14.52 | 10.02 | 24.21 | 21.63 | 23.3 |
| Canada | 2.66 | 3.94 | 7.79 | 14.93 | 8.85 | 10.62 | 22.95 | 25.41 | 36.58 | 47.21 | 43.54 | 52.5 |
| Eastern Europe[d] | 21.76 | 24.42 | 27.97 | 24.77 | 34.23 | 29.15 | N.A. | 23.41[e] | 68.88 | 87.54 | 86.48 | 102.3 |
| India | 6.95[c] | 8.10[c] | 12.98 | 15.23 | 14.17 | 10.81 | 13.44 | 17.76 | 32.92 | 46.04 | 53.57 | 70.1 |
| Mexico | 2.10[c] | 2.79 | 2.36 | 3.16 | 2.32 | 2.19 | 4.04 | 8.29 | 2.02 | 11.62 | 14.82 | 20.9 |
| China | N.A. | N.A. | N.A. | N.A. | N.A. | 14.21[f] | N.A. | N.A. | 62.97 | 135.62 | 154.48 | 182.4 |
| North Africa | 3.20 | 4.20 | 4.90 | 6.92 | 6.85 | 7.38 | 9.30 | 9.83 | 10.20 | 12.97 | 15.24 | 27.5 |
| South Africa[g] | N.A. | N.A. | .95 | .98 | 1.96 | 2.47 | 4.13 | 5.20 | 12.97 | 6.50 | 10.17 | 10.9 |
| Turkey[c] | 1.84 | 1.66 | 1.44 | N.A. | 2.71 | 3.69 | 8.01 | 7.89 | 8.00 | 13.80 | 12.70 | 29.0 |
| USA | 69.24 | 77.23 | 86.80 | 84.74 | 77.52 | 84.65 | 118.18 | 143.78 | 199.03 | 295.70 | 304.00 | 273.3 |
| USSR | 18.07 | 25.00 | 39.58 | 12.30 | 41.34 | 47.32 | N.A. | 66.12 | 178.04 | 140.50 | 143.70 | 199.8 |
| Brazil | N.A. | N.A. | N.A. | 3.99[g] | N.A. | 5.46[g] | 6.98[g] | 7.70[g] | 16.93[d] | 21.35[d] | 23.30[d] | 33.4 |
| Western Europe | 28.22 | 34.75 | 36.42 | 35.59 | 44.69 | 41.60 | 51.98 | 74.80 | 115.73 | 145.26 | 160.39 | 183.3 |
| World Total | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | 848.25 | 1,082.13 | 1,158.84 | 1,330.7[h] |

Sources: U.S. Department of Agriculture, *Yearbook*, 1899, 1907, 1915, 1925, 1935; Sanford Evans Statistical Service, *Grain Trade Yearbook* (Winnipeg, Canada), 1954-55, 1957-58; U.S. Department of Agriculture, *Agricultural Statistics*, 1965, 1974, 1985; and Food and Agriculture Organization of the United Nations, (Rome, Italy), *Food Outlook*, May 1988; FAO *Production Yearbook* 1987, No. 41.

[a]Wheat, corn, and barley.
[b]Wheat and barley.
[c]Wheat.
[d]Wheat and corn.
[e]Eastern Europe up to 1913 includes Austria, which used to be part of Austria-Hungary. Corn production for East Germany up to 1935-39 are estimated. Barley and wheat production for East Germany up to 1933 are estimated.
[f]Corn and barley.
[g]Corn.
[h]Wheat and coarse grains.
N.A.—not available.

**Appendix VII, Table 2. Long-Term Trend in Net Exports of Grains for Selected Regions and Nations in Millions of Metric Tons.[a]**

| | 1903 | 1913 | 1923 | 1933-34 | 1934-38 | 1955 | 1963 | 1973 | 1983 | 1986 | 1987 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| USSR | 4.81[d] | 7.23[b] | −.10 | 1.61 | .95 | 2.60 | 2.37 | −17.22 | −27.47 | −20.22[i] | −29.18 |
| China | N.A. | .02[d] | −.59[e] | −2.20 | −1.00 | .03 | −4.57 | −6.49 | −17.96 | −5.59[i] | −16.03 |
| Brazil | −.17[c] | −.44[c] | −.60[c] | −.91[c] | −.92[b] | −1.69[b] | −2.22[b] | −2.99[b] | −4.35[b] | −4.60[i] | −3.86 |
| Japan | −.08[c] | −.17[c] | −.40[b] | −.10[d] | −.46 | −3.21 | −6.01 | −14.44 | −21.70 | −21.63[i] | −27.38 |
| Egypt | −.00[i] | −.06[e] | −.03[e] | .01[e] | .00[e] | .00[i] | N.A. | −.07[i] | −1.40[i] | −8.85 | −9.20 |
| Mexico | −.01[i] | −.04[i] | −.09[i] | .00[i] | .03[e] | .05[e] | −.45[e] | −1.17[e] | 4.60[e] | −1.94[i] | −4.80 |
| Australia | .03[c] | 1.17[c] | 1.40[b] | 2.42[b] | 2.11 | 2.01 | 5.07 | 6.44 | 16.66 | 20.59[i] | 18.31 |
| Argentina | 3.79[d] | 7.66 | 7.11 | 10.02 | 10.08 | 4.50 | 4.34 | 6.88 | 17.07 | 11.52[k] | 9.37 |
| Canada | .18[d] | 3.61 | 7.48 | 5.27 | 4.23 | 6.48 | 11.45 | 15.32 | 28.09 | 22.58[i] | 28.46 |
| Eastern Europe[h] | .98[d] | 1.80 | .69 | 2.29 | 2.41 | −3.33 | −4.43 | −4.82 | −6.01 | −4.38[i] | −4.10 |
| India | 1.32[c] | 1.60[b] | .67[b] | .00[b] | .19[b] | −.44[c] | −4.08[c] | 1.83[b] | −3.22[b] | −3.82[b] | 0.61 |
| USA | 2.68[d] | 2.99 | 8.32 | .94 | .09 | 9.88 | 32.32 | 73.41 | 90.04 | 54.04[i] | 82.81 |
| South Africa | N.A. | −.15 | −.03 | .03[d] | .32[d] | .47[d] | 2.20 | 1.66 | .05 | 1.36 | 2.18 |
| Western Europe | −14.94[d] | −20.58 | −21.71 | −20.30 | −18.97 | −15.29 | −19.25 | −17.58 | 2.83 | 19.15[i] | 18.84 |

Sources: U.S. Department of Agriculture, *Yearbook*, 1907, 1915, 1925, 1935; Food and Agriculture Organization of the United Nations, (Rome, Italy), *FAO Trade Yearbook*, 1958, 1966, 1972, 1973, 1974, 1975, 1984, 1985, 1986, 1987.

[a]Wheat, corn, and barley.
[b]Wheat and barley.
[c]Wheat.
[d]Wheat and corn.
[e]Corn and barley.
[i]Corn.
[g]Barley.
[h]Eastern Europe up to 1913 includes Austria, which used to be part of Austria-Hungary. Corn and wheat trade for East Germany up to 1934-38 are estimated.
[i]Wheat, corn, barley, and oats.
[k]Wheat, corn, barley, rye, and oats.
[l]Wheat, corn, and oats.
N.A.—not available.

Price $8.50

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